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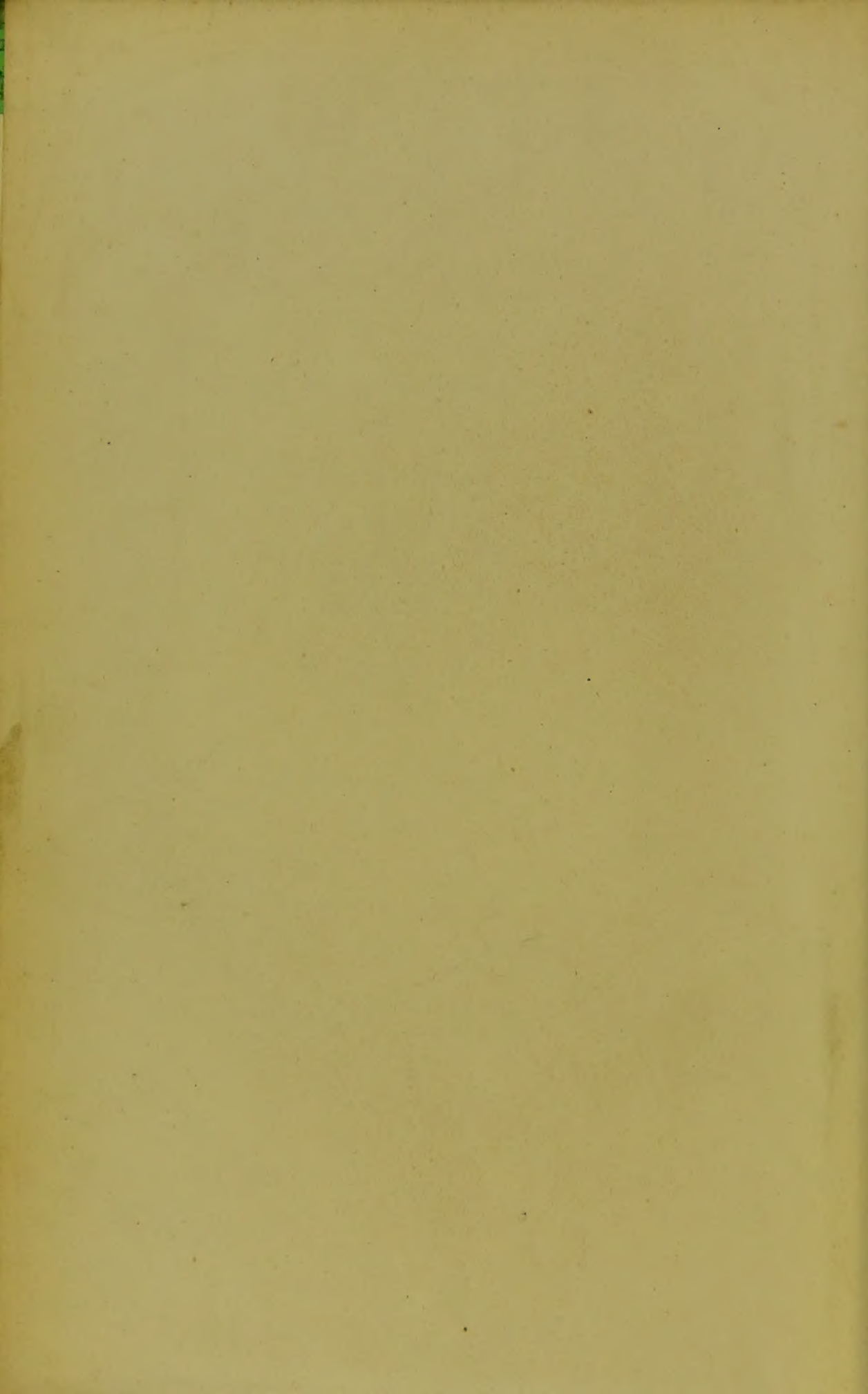
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OF THE

PRACTICE OF MEDICINE.

EDITED BY DR. H. VON ZIEMSSSEN,

PROFESSOR OF CLINICAL MEDICINE IN MUNICH, BAVARIA.

VOL. X.

DISEASES OF THE FEMALE SEXUAL ORGANS

By PROF. CARL SCHROEDER, of Erlangen, Bavaria.

Translated by

EDWARD W. SCHAUFFLER, M.D., of Kansas City, Mo.; LEONARD WHEELER, M.D., of
Worcester, Mass.; WILLIAM L. RICHARDSON, M.D., of Boston, Mass.; and
EDWARD B. BRONSON, M.D., J. HAVEN EMERSON, M.D., and
PAUL F. MUNDE, M.D., of New York.

ALBERT H. BUCK, M.D., NEW YORK,

EDITOR OF ENGLISH TRANSLATION.

LONDON:

SAMPSON LOW, MARSTON, LOW, & SEARLE,

CROWN BUILDINGS, 188 FLEET STREET, E.C.

1875.

(Entered at Stationers' Hall.)



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ERRATA.

VOL. I.

Page 14, thirteenth line from the bottom, "vaccination" should read "inoculation."

VOL. II.

Page 7, ninth line from the bottom, "element" should read "elements."

Page 172, second line from the bottom, "more" should read "less."

Page 194, last line, "months" should read "weeks."

Page 353, last line of foot-note, "9" should read "328."

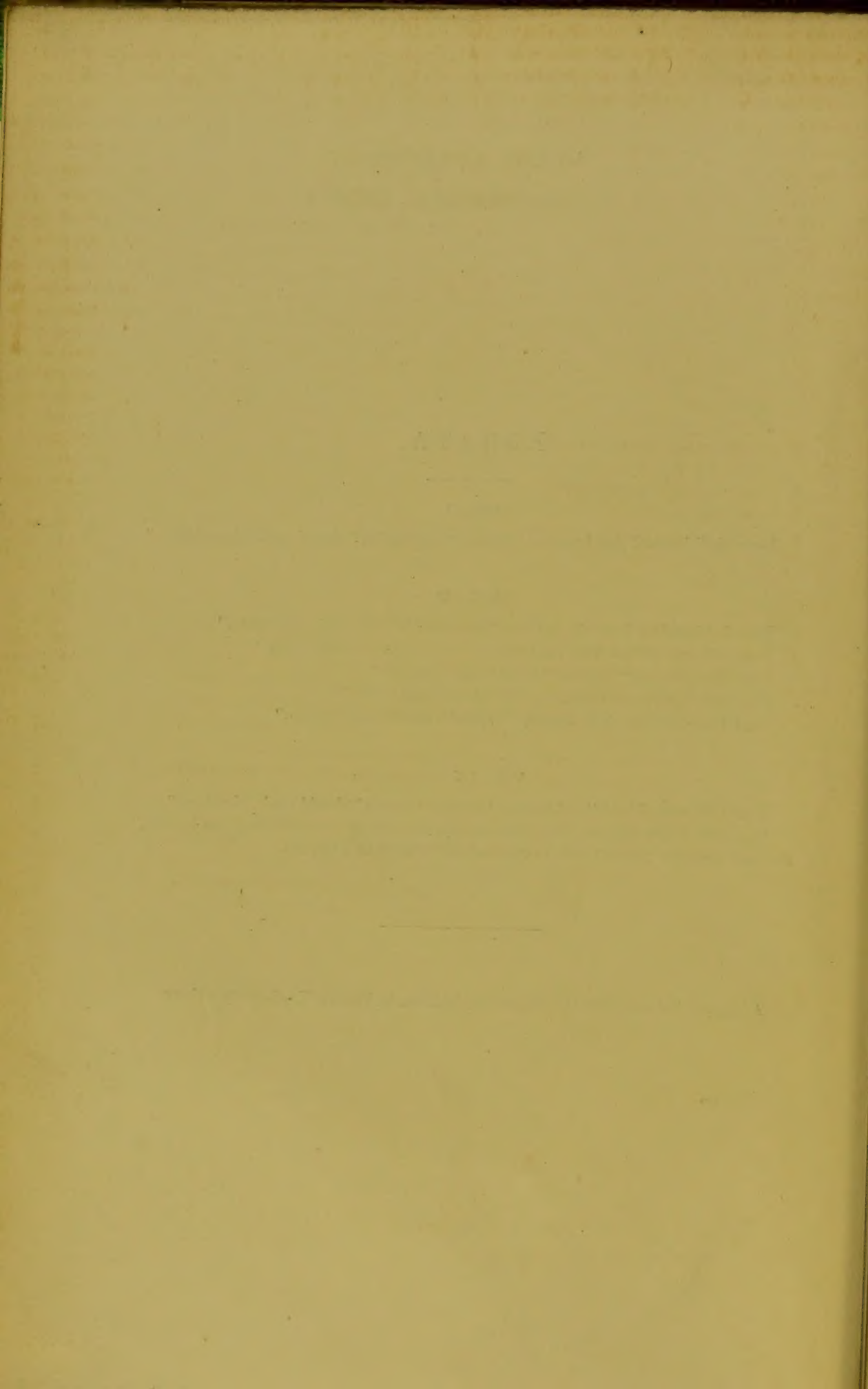
Page 453, third line from the top, "spinal" should read "spina."

VOL. III.

Page 290, second text-line from the bottom, "ounces" should read "drachms."

Page 558, fourteenth line from the top, and also seventh text-line from the bottom, the dash between "liver" and "echinococcus" should be a hyphen.

A biographical sketch of the author will be given in Volume V.—EDITOR'S NOTE.



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(Translated by Edward B. Bronson, M.D.)

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DISEASES
OF THE
FEMALE SEXUAL ORGANS.

SCHROEDER.

GYNECOLOGICAL EXAMINATION.

HISTORY.

GYNECOLOGICAL examination, as practised at the present day, is essentially a product of this century. If we were obliged to dispense with the speculum, sound, and conjoined or bimanual examination, and confine ourselves solely to the digital exploration of the vagina and cervix, we should find ourselves almost powerless against the diseases of the uterus and its appendages.

The methods of examination of the ancients were exceedingly defective. Soranus, however, one of their best representatives, was acquainted with the method of digital exploration, the examination with the sound (at least its introduction into the vagina, where it “*ad imum usque penetrat*”) and the vaginal speculum (*διοπτρισμος*), which affords the best means of ascertaining whether a hemorrhage comes from the uterus or vagina. In the third chapter of his book, he also clearly and precisely distinguishes the uterus from the vagina, beside describing the position, shape, and various parts of the womb. Regarding the diseases of this organ, he makes the important observation, “*Morbo laborans in consensum rapit ventriculum et meninges*,” and speaks of the “*puendum muliebre seu sinus muliebris, velut intestinum, in quo etiam coitus fieri solet*.” He also mentions the differential diagnosis of abdominal tumors, and distinguishes pregnancy from ascites, and from solid tumors, which he classes under the name of *μυλη* (*mola*). These latter, he says, are distinguished from ascites by the fact that the hand cannot press into or displace them, and because there is no tympanitic resonance, and no fluctuation when percussed with the hand.

However remarkable these statements may appear, considering the early period at which they were made, the views they express probably never became general, and, at any rate, were

entirely lost sight of until the middle ages, when, at the end of the seventeenth century, eminent French physicians began to practise midwifery as a specialty, and again developed the art of gynecological examination. It is surprising that the method of *conjoined manipulation*, which was already known to Puzos († 1753), Levret, Baudelocque, Jörg, W. J. Schmitt, and others, should not have been properly appreciated until it was resuscitated within the past few years, principally through the efforts of Kiwisch, Veit, Holst, Schultze, and others; it is equally surprising that even at the present day many gynecologists do not seem to be perfectly familiar with this mode of examination, although it has done far more to improve the art of diagnosis of female diseases than the invention of the uterine sound.

The *vaginal speculum* also has come into general use only since the beginning of this century. The ancients, it is true, were acquainted with the instrument; Soranus and Paul of Ægina mention it, and in the excavations at Pompeii a speculum was found, the three branches of which are expanded by a screw. In later authors also, Abulcasem and Rueff for example, we find representations of specula, which, however, were only used for the purpose of dilating the vagina in order to permit the application of craniotomy instruments to the head of the foetus. But Ambroise Paré describes specula with three branches, which he states expressly are adapted to the purpose of bringing malignant tumors of the cervix better into view; illustrations of similar two- and three-bladed specula are likewise given by Scultetus in his *Armamentarium Chirurgicum*. Nevertheless, it is only since the invention by Récamier of the cylindrical speculum with a handle, that the vaginal speculum has come into general use as an aid in making the diagnosis. Its shape has in recent times undergone so many modifications that in multiplicity of form it might almost vie with the obstetrical forceps.

The *uterine sound* was first used by Levret, who in 1771 employed it in the case of polypi, and for the purpose of measuring the length of the uterine cavity in hypertrophy of the cervix. Chambon, Vigarous, Désormaux, Dance, and particularly Lair, also made use of the uterine sound as an aid to the diagnosis.

Its utility was still further developed, and the instrument brought into general use by Simpson in England, by Huguier in France, and by Kiwisch in Germany, almost at the same time; each observer apparently acting independently of the others. The sound was warmly received on almost every side, and, indeed, before the general introduction of bimanual palpation, was the only means at our command by which we were able to ascertain the position and size of the body of the uterus. Latterly, however, the sound has been, in a measure, supplanted by the more perfectly developed bimanual palpation; but still in many cases it is a very useful, and in some an indispensable auxiliary.

THE POSITION OF THE PATIENT.

The position of the patient during examination is of the greatest importance, if we wish to obtain full and satisfactory results.

It is only exceptionally that a woman is examined in the *erect posture*, as, for instance, when we desire quickly to inform ourselves by the touch of the condition of the external genital organs—the vagina and the cervix—or when we wish to see how a strong abdominal pressure affects the genital organs. Other advantages than these are not gained by the examination in the erect posture. The supposed advantage of bringing the internal genital organs nearer to the vaginal orifice is more imaginary than real; for in the erect posture the womb is tilted forwards, in consequence of which the cervix is deflected backwards, and rendered more difficult to reach with the finger than in other positions of the body (as, for instance, when the patient lies upon the back and the bimanual method of palpation is employed).

The examination in the erect posture should be rejected for several reasons: first, it affords only very superficial information by the touch regarding those parts mentioned above; secondly, the external and conjoined methods of examination cannot be employed in this posture; and finally, the important aid afforded by the sense of sight must here be dispensed with.

In England examinations are generally made in the *lateral position*. The patient lies on her left side, on a table covered by a mattress; her left arm is extended over on the back, the left thigh is slightly flexed, the right one more so. The physician stands behind the patient and examines with his right hand, the thumb resting on the perineum.

The lateral position, for the purpose of digital examination, should be abandoned; partly because the sensitive palmar surface of the index finger is turned towards the posterior wall of the vagina, and the curvature of the finger and that of the vagina, therefore, do not correspond; but principally because conjoined manipulation is either impossible in this position or is very inconvenient. In using the original Sims's speculum the lateral position becomes necessary; but we shall refer to this point later.

The *dorsal position* is the only one in which conjoined manipulation is admissible, and therefore, considering the importance of this method of examination, it must be regarded as the ordinary position for gynecological examinations,—all the more so because it is equally well adapted to the other methods of exploration (particularly the introduction of the speculum). Of course in the dorsal position the patient requires to be properly arranged.

The ordinary position in bed usually suffices for digital exploration, if the head of the patient is laid horizontally and her lower extremities are abducted. If the bed be a mattress, and not a feather bed, the internal and external examinations, as well as the two combined, can be performed with convenience and facility. An examination with the speculum, however, is exceedingly inconvenient under these circumstances; partly on account of the low position of the patient, and partly because of the difficulty of obtaining a good light.

Hence, if a thorough investigation is deemed necessary, and we desire to avail ourselves of all the diagnostic means at our disposal, a special couch must be prepared. A mattress is placed upon a table of moderate height, upon which the patient is made to lie down. The feet may be placed upon two chairs or upon the border of the mattress, but the abdominal parietes,

are most thoroughly relaxed if the feet are held by assistants in the lithotomy position.

Inasmuch as the preparation of such a couch for every examination is very troublesome, the gynecologist should provide himself with a table or chair especially devised for the purpose.

We consider all the contrivances which have been invented to simulate the ordinary sofa, and which, when occupied by the unsuspecting patient, are suddenly, by the turning of a crank, converted into complicated office chairs, to be unnecessary and wrong in principle. We require of a good examining chair merely that it should be practical and convenient. In order that it may be of a light and not too imposing form, it should be made of iron and not of wood, and be provided with a proper movable support for the patient's feet. Its height should be such as to place the vulva of the patient on a level with the elbow of the examiner. A wooden step should be provided as a rest for the physician's foot, so that the forearm used in the examination may find a convenient support upon the knee.

Chairs of this kind, which answer this purpose more or less completely, are described by Baumgärtner,¹ Mauke,² and Bresgen.³

We have used satisfactorily one devised by Veit, and constructed by the instrument-maker Eschbaum, in Bonn. This chair is in every respect adapted to gynecological examinations, excepting that it is not convenient for abdominal auscultation, nor for the examination in the lateral position.

MANUAL EXAMINATION.

External Examination.

External examination is practised alone only in large abdominal tumors, for the purpose of ascertaining their shape, boundaries, and consistence. The examination consists essentially in a careful palpation of the surface of the abdomen. A fami-

¹ Wien. med. Woch., 1863, Nos. 37 and 38.

² M. f. Geb., vol. 26, p. 208.

³ Berl. Klin. Woch., 1873, No. 37.

liarity with the manipulation is best acquired by frequently practising it upon women near the end of pregnancy.

Palpation is best performed by placing both hands upon the abdomen, the fingers being extended and touching each other, and then by means of short, quick impulses, testing the resistance offered to the hand at different spots. The better defined and harder the tumor is, the more perceptible are its boundaries to the touch. Palpation is much facilitated if the abdominal walls are thin and lax, and especially after complete evacuation of the bowels and bladder. Intestines filled with fæces or gas offer the most frequent obstacle to palpation. The physical condition of the abdominal parietes is also very important: even large, hard tumors can frequently be only very imperfectly defined on account of the very thick abdominal walls containing a deep layer of adipose tissue. Some women, again, with the best intentions, are quite unable to relax their abdominal muscles. These difficulties must be overcome by pressing in the hand more deeply during each expiration, by attracting the attention of the patient with inquiries concerning her history, and, as a last resort, by anæsthesia.

Anæsthesia should certainly always be employed when an important therapeutic measure depends on the evidence acquired by palpation, and the latter has yielded no absolutely positive results. There are a number of conditions which may be mistaken for abdominal tumors, such as a large accumulation of adipose tissue in the abdominal walls, partial contractions of the abdominal muscles, fatty omentum, tympanites, and fæcal concretions in the intestine, all of which give the sensation of a diffused resistance, in some cases even of an indistinct tumor, and may therefore give rise to an erroneous diagnosis. I can call to mind two patients who were sent to me for ovariectomy, whose ovaries were not only not diseased, but who did not even have a circumscribed abdominal tumor. Among the records of cases of so-called "spurious pregnancy" such instances are by no means rare.

Percussion is a very important diagnostic auxiliary in many abdominal tumors. The limits of solid and encysted fluid tumors may, it is true, be more accurately and clearly defined by means of palpation; but where there is free fluid in the abdominal cavity, or in the case of very flaccid cysts, palpation is unsatisfactory, and we have to depend upon percussion.

In some other cases also, in which palpation is attended with

difficulties, percussion is preferable ; but generally palpation is so much more certain and reliable, that when there is nothing to interfere with its employment, percussion may be dispensed with.

Auscultation is likewise required only in large abdominal tumors ; but in these cases it acquires a very great importance through its enabling us to diagnosticate pregnancy. The so-called uterine souffle, which originates in the larger arteries, is heard, not so very seldom, in large fibroids, and also, though very rarely, in ovarian tumors.

Internal Examination.

The internal examination *per vaginam* is performed by introducing the index finger of one hand into the vagina. This is done by passing the well-oiled forefinger from the fourchette into and through the ostium vaginæ ; the other fingers being extended upon the perineum. In case it is desired to touch the anterior wall of the vagina, and the anterior vaginal vault, it is advisable to flex the other fingers into the palm of the hand.

The several organs, with which the exploring finger comes in contact in its progress inward, should be noted in the following order : fourchette, introitus vaginæ, vaginal walls, together with any enlargement of the neighboring organs (bladder or rectum), which would cause protrusion of the vaginal walls, anterior and posterior vaginal cul-de-sac, cervix, and lower segment of the uterus, as well as the pelvic cellular tissue surrounding these organs.

As accurate and comprehensive an idea of the condition of the above-mentioned organs may be obtained by the examination *per vaginam*, as it is possible to obtain by the sense of touch in any part of the body.

Very valuable information is thus often acquired ; still the upper half of the uterus, the tubes and ovaries, together with their peritoneal envelope, and a large portion of the pelvic connective tissue—that is, just those parts of the genital apparatus which are pathologically the most important—remain unexplored.

The examination is, as a rule, easy and simple to perform, and it is but seldom necessary to introduce two fingers. Very rarely are any decided impediments encountered, although occasionally the examination may be exceedingly difficult.

Large tumors which interfere mechanically with the vaginal exploration, as well as extreme constriction or atresia of the vaginal entrance, are rare. The most common obstacle, although rarely an insuperable one, is an intact hymen. The opening in the hymen is generally sufficiently large to admit the finger, if introduced gradually and with care; but the introduction is usually so painful as to make it advisable, unless the orifice of the hymen is unusually large, to examine virgins under anaesthesia; the same may become necessary also in women whose vaginal aperture is pathologically sensitive.

The internal examination per rectum is employed either when the vagina is impassable, or as a valuable aid and supplement to the vaginal examination. It should be particularly borne in mind, *that in all kinds of retro-uterine tumors, the exploration by the rectum is unequalled in value by any other method.* Tumors of tolerably large size are frequently discovered only by means of this method of manipulation, and one is often surprised, upon a rectal examination, at the great size of a tumor which appeared insignificant when examined through the vagina. It is, therefore, my invariable rule to examine retro-uterine tumors, not only per vaginam, but also per rectum. In some cases, also, in which the vagina is short and unyielding, as in women who have not borne children, exploration through the capacious rectum is preferable to the vaginal examination.

Conjoined Method of Examination.

Veit, Krankh. d. weibl. Geschlechtsorg., 2 Aufl. Erlangen, 1867, p. 254.—Holt, Beitr. z. Geb. u. Gyn., H. 1. Tübingen, 1865, p. 1.—Schultze, Jenaische Z. f. Med. u. Nat. Leipzig, 1864, I., p. 279, und 1870, V., p. 113.—Sims, Clinical Notes on Uterine Surgery. New York, 1871, p. 8.

The peculiarity of conjoined manipulation is, that the organs to be examined are pressed between both hands. For this purpose the index finger of one hand is used for the internal examination—usually per vaginam—while the other hand presses upon the abdomen.

The hand on the outside pushes the organs in the true pelvis toward the finger in the vagina, and *vice versâ*. In this manner the two hands grasp the organs of the true pelvis, being separated from them externally only by the abdominal walls, intern-

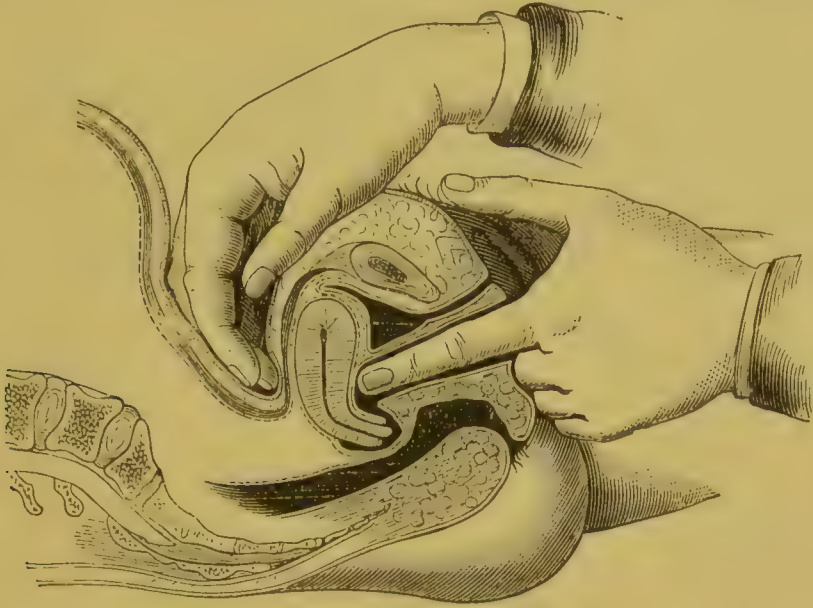


FIG. 1.
Conjoined method of examination.

ally only by the vaginal mucous membrane. It is important that the two hands should accurately correspond to each other, in order that the organ under examination may lie exactly between the internal and external palpating fingers.

For the purpose of bimanual palpation it is best that the patient be placed on an examination-chair (although the manipulation may also be accomplished with tolerable facility on an ordinary bed), and the index finger of one hand is then introduced into the vagina in the manner described above. While the finger is placed against the cervix or the anterior vaginal cul-de-sac, the other hand is slowly pressed deeply into the abdominal wall above the symphysis pubis, the examiner taking advantage of each expiration, if the parietes are tense, to sink it still deeper. If the hand has not been pressed in too close to the symphysis (in which case the uterus is liable to be pushed backwards), the normally situated uterus is soon grasped between the fingers ; its position, size, shape, consistence, and mobility are ascertained,

and the physician then proceeds with his finger to examine the remaining pelvic organs. Having quitted the uterus, he then brings his fingers into close proximity to each other, with only the abdominal and vaginal walls between them. If, then, the true pelvis is explored while the fingers are constantly kept just opposite each other, hardly any tumor, however small, will escape detection. The left lateral half of the pelvis is best examined by the left index finger, and the right half by the right finger.

In this manner the condition of the several organs in the true pelvis may be ascertained very definitely; the uterus can be felt, unless the circumstances are very unfavorable, with great distinctness, even when it is dislocated backwards. Its shape, consistence, and mobility can be made out with perfect ease. To estimate its size with any accuracy is more difficult; generally the liability is, where the abdominal walls are rather thick, to estimate it too large. Caution should also be exercised in judging of its position, because pressure upon it from without is sometimes liable to dislocate the womb backwards, though much more commonly forwards. On either side of the uterus are felt more particularly, the uterine appendages, the free border of the broad ligaments, the tubes and round ligaments; the latter feel like thin cords rolling underneath the fingers. The normal ovaries may also be detected as small spherical bodies, which easily slip away from the finger. Pathological growths are the more easily detected by conjoined manipulation, the harder they are and the nearer they lie to the anterior pelvic wall.

If properly performed, the procedure of conjoined manipulation causes no pain whatever, only a slight discomfort when the pressure is very deep and strong; the ovaries merely, according to our experience, are somewhat sensitive to firm pressure even in their normal condition.

In every case, when proceeding to make an examination, I place one hand on the abdomen and allow it to rest there quietly, or with gentle pressure, while I explore the vagina with the other. The advantage of this is, that the patient becomes accustomed to the external hand, which, when required, is ready to perform its part in bimanual palpation.

The procedure is rendered difficult or impossible by all the

circumstances mentioned above, as being obstacles either to the vaginal or to the external examination. In the former case we are prevented by constriction, shortness, and hyperæsthesia of the vagina; in the latter, by thick, unyielding abdominal walls, contracted abdominal muscles, and distended intestines or bladder.

The value of conjoined manipulation will be readily appreciated if we consider that, by means of the external examination alone, no part of the normal sexual organs is accessible, while by the internal examination only the vagina and the lower segment of the uterus are felt, whereas by bimanual palpation the entire contents of the true pelvis are brought within reach of the examiner's fingers. It is not saying too much to assert, that from the introduction of conjoined manipulation dates a new era in gynecology.

Only in the case of very large tumors is conjoined manipulation superfluous, owing to the fact that they generally lie close to the brim of the pelvis, thus rendering it more advantageous to make the external and the internal examinations separately.

Instead of combining abdominal palpation with the vaginal touch, the internal part of the examination may also be made through the rectum. Of course, the latter mode is chosen whenever the vaginal exploration is impossible or difficult. Besides, it is particularly valuable in the case of a short, tense vagina, with unyielding vaginal vault, and, above all, in connection with retro-uterine tumors.

In some cases, especially where the genitals are very flaccid, the thumb can be introduced deep into the vagina, simultaneously with the rectal examination, and in this way the recto-vaginal septum and Douglas's cul-de-sac may be very conveniently explored.

The examination per rectum has of late been greatly improved by Simon,¹ who has demonstrated that, under chloroform-narcosis, four fingers, and even the entire hand, may be passed into the intestine.

For this purpose the patient is profoundly anæsthetized, and

¹ Archiv für klin. Chir., B. 15, p. 99, and Deutsche Klinik, 1872, No. 46.

the lower portion of the bowel cleansed by injections of warm water. The well-oiled hand is gradually passed through the anus—first two, then four fingers are introduced, and finally, also, the thumb is passed in with a rotary dilating motion. If the cutaneous margin of the anus threatens to tear, it is better to incise it at once in one or more places. The lower portion of the rectum is wide enough to easily accommodate the hand, and the bowel does not begin to narrow until it receives an investment from the peritoneum, which attaches it to the sacrum. This point is situated at about the third sacral vertebra,—from twelve to fourteen centimetres (about six inches) above the anus. Above this only

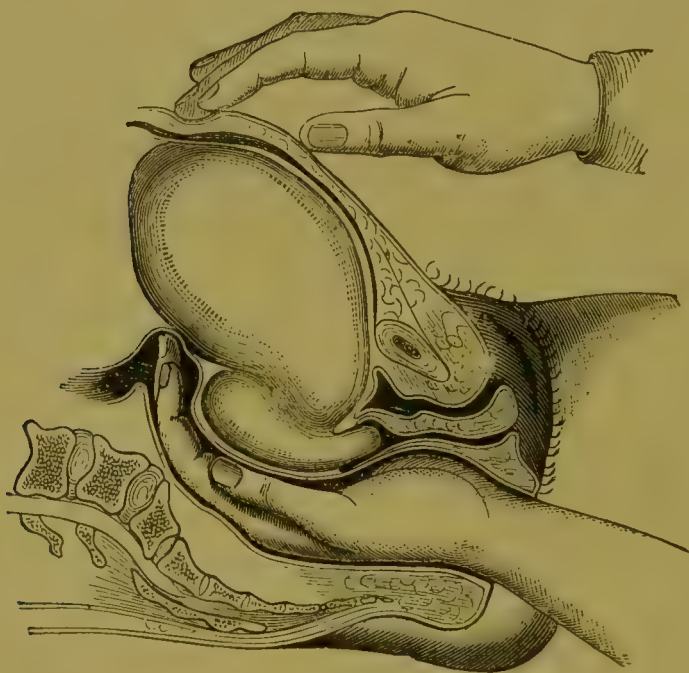


FIG. 2.

Rectal palpation, after Simon.

four fingers of the hand can pass. If care is taken to avoid forcible dilatation of the sigmoid flexure, this exploration is not dangerous; the lacerations or incisions of the cutaneous border of the anus heal rapidly, and even injuries of the sphincter are completely obliterated in the course of twelve days. The dilatation itself, at the most, produces merely a temporary incontinence.

The above method of examination is of especial value in

those gynecological cases in which a connection is suspected between large tumors and the sexual organs. When the uterus is situated behind the tumor, its relation, or that of the ovaries, to the tumor, can be ascertained only in this way.

In the great majority of cases, if conjoined manipulation is employed, the introduction of four fingers will suffice.

EXAMINATION WITH THE UTERINE SOUND.

Simpson, Sel. Obst. and Gyn. Works. Edinb., 1871, p. 604.—*Huguier*, De l'hystérométrie, etc. Paris, 1865.—*Kiwisch*, Klin. Vortr., etc., 4 Aufl., B. 1. Prag, 1854, p. 36.—*Scanzoni*, Beitr. z. Geb. u. Gyn., I. p. 173.—*Joseph*, Berl. Beitr. z. Geb. u. Gyn., B. III. p. 23.

As the interior of the uterus is not ordinarily accessible to the finger of the examiner, specially constructed sounds are used for the exploration of the uterine cavity.

The construction of the instrument is a matter of very great importance. The old-fashioned, thick, inflexible sounds of German silver are perfectly useless.

A good uterine sound (see Fig. 3) should be neither too thick nor too thin (two or at the most three millimetres in diameter), and should be provided with a very small button-shaped tip. Above all, it should be made of flexible metal (tin, copper, or fine silver), so as not to be perfectly rigid within the genitals, and in order to permit of a different shape or curvature being given it by simply bending it, according to the requirements of the case. It will be found convenient to have a slight enlargement, about seven centimetres ($2\frac{3}{4}$ in.) from the point, to mark the normal length of the uterine cavity, and for this distance it is bent to correspond with the normal anteversion of the uterus. A centimetre scale marked on it facilitates measurements; but the markings should be very superficial and not cause any roughness.

The manner of using the sound is exceedingly simple. It should be held as lightly as possible, and it should never be forgotten that the fingers are holding an exploring instrument which is to seek an already existing canal, and not to bore a new one. Conjoined manipulation should always precede the intro-

duction of the sound, to determine the direction which the instrument is to take. In marked flexions at the internal os the sound should have a more decided curvature; it will then be found more difficult to introduce it into the external os, but it will pass the os internum more easily and without injuring the mucous membrane.



FIG. 3.

Silver uterine sound,
reduced size.

a, More decidedly curved,
for use in ante flexion.

In introducing the sound, its tip is to be passed into the external os, under guidance of the finger, and then, feeling our way forward, we should push the instrument on in the direction of the uterine canal, which has been previously ascertained by conjoined manipulation. At the internal os it is generally necessary to depress the handle of the sound towards the perineum, since the uterus is somewhat anteverted.

The *indications* for the use of the sound are stated very differently by different authors. Some gynecologists employ it almost without exception in every case; others, however, use it comparatively seldom, only when they expect to derive from it some especial, not otherwise obtainable information. I must confess that I belong to the latter class.

The most important indication is *the measurement of the length of the uterine cavity*, which cannot be ascertained in any other way. The size of the uterus may, to be sure, be estimated with tolerable accuracy by bimanual palpation, if the examiner has had sufficient practice; it is, however, extremely difficult, if the abdominal walls are very thick, and especially if the uterus itself is particularly flaccid. Under these conditions, though the organ may be indistinctly felt, it is impossible to determine its exact length. We must consider, moreover, that the size of the uterus, as estimated by external palpation, and the length of its cavity, do not coincide. A comparison of the results of palpation and measurement of the uterine cavity by the sound will

frequently give us the thickness of the uterine wall. The sound may further be employed to determine the thickness of this wall, by feeling for the tip of the instrument in the uterus externally, and thence estimating the diameter of the intervening uterine tissue.

A second indication relates to the *ascertainment of the course taken by the uterine cavity*. Generally this course can be determined with sufficient accuracy by palpation alone, and only exceptionally do we need the sound as a diagnostic aid in uterine displacements. There are cases, however, in which the uterus cannot be felt separately, or in which palpation affords us no information regarding the course of the uterine cavity. The former is often the case in large inflammatory exudations, in which the uterus is, so to speak, walled in, and its position cannot be determined by palpation; the latter happens particularly in the case of fibroids, which may change the external shape of the uterus, as well as the course of the uterine cavity, in various ways, concerning which only the sound can give us any precise knowledge.

A further use of the sound is to decide *whether the uterus is empty or not*. This is by no means as easy as is generally supposed. An obstacle at the internal os (constriction, a fold of mucous membrane, flexion, spasm) may give rise to the suspicion that a foreign body occupies the uterus, and, on the other hand, in cases in which the uterus does contain a foreign body, the sound may either easily penetrate this body (as in the case of soft coagula), or pass between it and the uterine wall. The latter may happen in the case of polypi, but especially in pregnancy, where the sound, when dexterously guided, hardly meets with any resistance at the internal os. Great experience and an extremely delicate touch are essential in deciding this question, and even with these advantages, mistakes are not always avoided in difficult cases.

A suspicion of pregnancy, of course, precludes the use of the sound.

A very important, although rare, indication is presented *when it is desired to test the permeability of the uterine canal*. The presence of atresia or constriction of this canal can be ascer-

tained only by the sound, and often only by one of very small size.

In some cases the sound may be exceedingly serviceable in *facilitating, or even rendering possible, palpation of the uterus*. In this connection we do not so much refer to the cases in which a retroflexed uterus, which is with difficulty accessible to the touch, is lifted forward by means of the sound, as to those in which the uterine walls are exceedingly flaccid and thin, and where palpation of the uterus is impossible, unless the womb is supported by the sound; the tip of which may then generally be felt so distinctly as to appear to lie directly under the abdominal peritoneum.

In testing the mobility of the uterus the sound should be used with the greatest care; indeed the instrument is but seldom needed for this purpose, and should never be employed when inflammatory adhesions are present. When this is the case, the mobility of the womb may be tested equally well by conjoined manipulation; and, besides, under these circumstances the sound is dangerous. Occasionally, however, when the question arises as to how intimately the uterus is connected with a pelvic tumor, the sound may be used to great advantage.

As a test of the sensitiveness of the internal surface of the uterus, the sound should be employed with great caution; still, valuable hints respecting treatment may be given by the different degrees of sensitiveness evinced at the internal os, the fundus, etc.

Although the introduction of the sound, by a person who has some degree of dexterity, is, as a rule, a very simple operation, yet various difficulties may be encountered. Foremost among these are constrictions of the cervical canal, which may require the employment of sounds of very small size. When the constriction is not congenital nor cicatricial in character, but is due to a swelling of the mucous membrane, a very fine sound should not be used, because it is liable to catch in the little folds of mucous membrane, whereas a sound of larger size will pass through readily.

The deviation in the position of the cervix, in versions of the uterus, rarely gives rise to any trouble in introducing the sound,

since, with a little practice, the point of the instrument can be passed into the displaced os, and the position of the cervix may be easily altered. More difficulty is often experienced in overcoming the angle at the junction of the body and cervix in flexions. We have already mentioned that in such cases the sound must be bent; moreover, in ante flexion it must be depressed towards the perineum; in retro flexion it is introduced with the concavity pointing backwards.

Tumors, particularly fibroid, which obstruct the uterine canal, render the introduction of the sound more difficult. A good silver sound will, however, bend so easily as to adapt itself to the direction of the canal. In some cases a thin elastic catheter, into which a wire has been introduced, is preferable.

A very rare occurrence is the detention for a few moments of the sound by a temporary spasmodic contraction of the internal os.

We have yet to speak of the *dangers* which may attend sounding of the uterus.

As a rule, I consider the sound harmless, provided it is employed by an experienced hand, and the direction which it is to follow has been previously ascertained by conjoined manipulation; and, in the case of flexions, provided it is bent at the proper angle. But even under these conditions the use of the instrument may exceptionally be followed by inflammation.

In acute inflammations of the uterus and its immediate vicinity, it is best to avoid sounding, although if the physician is very expert, and the results to be derived are sufficiently important, the attempt may be cautiously made. In chronic inflammations, the danger is much less, but still exists, and therefore the sound should generally be avoided.

Above all, the fact should be constantly borne in mind that the use of the sound involves the least danger when it produces no alterations in the position of the uterus.

That the sound is not to be used in case of pregnancy has been already observed. We will here only urge the importance of always bearing in mind, when about to employ the sound, the possibility that pregnancy may be present, and, moreover, that

not unfrequently this possibility is realized in cases where the presumption was against it.

The fact that, unless the ovum is ruptured, gestation is generally not disturbed by a careful examination with the sound, is no excuse for a thoughtless or incautious employment of the instrument.

If the sound is forcibly and carelessly introduced, hemorrhage and violent inflammation may ensue, even in a normal state of the womb. Perforation of the normal uterine wall by the sound rarely occurs, and is most frequently met with in connection with artificially induced abortion.¹

We say the normal uterine wall, because in soft, flaccid, puerperal uteri, even a very careful introduction of the sound may cause a perforation of the doughy uterine walls.

The cases in which the sound has been passed very deep into the non-enlarged uterus (from 15 to 20 centimetres above the external os) have not attracted the attention of gynecologists until quite recently. Duncan² and Veit³ first described such cases; Hildebrandt⁴ then reported two instances in which he claimed positively that he had sounded the Fallopian tubes. Höning,⁵ however, showed that the sounding of the tube, laterally situated as it is, and firmly attached to the broad ligaments, is out of the question, if the point of the sound can be felt near the umbilicus, and I have also been convinced in two cases⁶ that the sound must have perforated the uterine tissue. Noeggerath⁷ and Martin⁸ have lately demonstrated the occurrence of perforation at the autopsy. Simpson⁹ also states that in "superinvolution" of the uterus, he has several times seen the sound pass through the uterus into the abdom-

¹ *Pétréquin* and *Foltz* (Bulletin de l'Acad. de Méd., 34 p. 1253) report a case in which the sound, having been introduced for the purpose of inducing abortion, disappeared through the os, and was finally extracted through an incision in the abdominal wall under the umbilicus.

² *Edinb. Med. Jour.*, June, 1856.

³ *Krankh. der weibl. Geschlechtsorgans*, 2 Aufl., p. 258.

⁴ *M. f. Geb.*, B. 31, p. 447.

⁵ *Berl. klin. Wochenschr.*, 1870, No. 16.

⁶ See *Alt*, *Berl. klin. W.*, 1870, No. 42.

⁷ *Amer. Jour. of Obst.*, IV., p. 329, where cases by *Budd*, *Thomas*, and *Reynolds* are also reported.

⁸ *Neig. u. Beug. d. Gebärmutter*, 2 Aufl. Vorwort, p. VII. The case of *Rabl-Rückhardt* and *Lehmus* (*Berl. B. z. Geb. u. Gyn.* Berlin, 1872, B. II., p. 12, and *Berl. klin. W.*, 1872, No. 1) is more fully reported.

⁹ *Diseases of Women*, p. 604.

inal cavity without evil consequences. Besides these, cases have been reported by Zini¹ as instances of sounding the tubes, which belong under this same head, and Lawson Tait's² examples of "utero-peritoneal fistula," which he attributes to unobserved *ruptura uteri inter partum*, are doubtless to be explained in the same manner.

In the majority of these instances the patients were tuberculous, and had suffered from post-partum hemorrhage or severe puerperal disease of some kind. In such cases, according to Klob,³ the uterus may undergo fatty degeneration, so that its substance readily tears, "the laceration being bridged over by delicate mucous fibres like the web of a spider." Under these circumstances the uterus will naturally permit even a carefully manipulated sound to pass through its spongy wall and enter the abdominal cavity.

In none of the above-mentioned cases, strange to say, did any evil result follow the perforation.

It is perfectly obvious that the sound cannot enter the normal uterine orifice of the Fallopian tube; on the other hand, two cases reported recently have demonstrated the fact that the tube may exceptionally become so dilated that the sound may pass into it. In the first of these cases, which was described by Lehmann,⁴ there was an ovarian tumor of the right side; the uterine orifice of the right tube was so patulous that the sound, which had been introduced to the depth of 28 centimetres, had, without doubt, passed into the tube. In the second case, related by Bischoff,⁵ there was also an ovarian tumor; the sound entered the uterus to the depth of 17 centimetres, and after death from ovariectomy the uterus was found dislocated so far to the right side as to place the uterine orifice of the left tube in a straight line with the uterine canal, and the tubal orifice was funnel-shaped, and sufficiently wide to easily admit the sound.

The validity of the explanation given above, which applies to the majority of these cases, is, of course, in no way affected by these rare exceptions.

DILATATION OF THE CERVIX FOR DIAGNOSTIC PURPOSES.

Simpson, Sel. Obst. Works, 1871, p. 733.—*C. Braun*, Wiener med. Wochenschr., 1, August, 1863.—*Sims*, Clinical Notes on Uterine Surgery. New York, 1871, p. 39.—*Spiegelberg*, Volkmann's Samml. klin. Vortr., No. 24, p. 217.

Inasmuch as the sound is but a poor substitute for the finger, it not unfrequently becomes desirable, for the purpose of diagno-

¹ Sitz.-Ber. d. Vereins d. Aerzte in Steiermark, VII., p. 17, 1869-70. See also *Schmidt's Jahrb.*, B. 151, p. 162.

² *Lancet*, May 18 and October 2, 1872, and *Boston Gyn. J.*, Vol. VII., p. 147.

³ *Pathol. Anat. d. weibl. Sexualorg.* Wien, 1864, p. 206.

⁴ *Nederl. Tijdschr. v. Geneesk.*, 1870, I., p. 201.

⁵ *Corresp.-Bl. Schweizer. Aerzte*, 1872. No. 19.

sis, to introduce the finger itself into the cavity of the uterus. As a rule, this cannot be done without a preliminary artificial dilatation of the cervical canal. It is impossible by incision to lay open the normal cervix sufficiently to admit the finger, and hence we are obliged to resort to a bloodless dilatation. This, however, cannot be adequately accomplished by means of forcibly dilating instruments, but a gradual stretching and relaxation of the cervix may be obtained by the introduction into the cervical canal of certain substances which expand slowly. At present only sponge-tents and laminaria are used for this purpose.

Instruments of various kinds have been devised for the forcible dilatation of the cervix, both for obstetrical and gynecological purposes. Osiander¹ invented a two-bladed speculum, conveniently modified by Carus,² and Basch³ a three-bladed instrument. The one constructed by Mende⁴ is remarkably like the speculum *matricis* of Ambroise Paré. Priestley's dilator⁵ only imperfectly fulfils its object; that of Atlee⁶ is similar to Osiander's, and Peaslee⁷ of late recommends steel bougies of various sizes for gradual dilatation. Ellinger⁸ has recently devised an instrument for rapid dilatation, the branches of which are constructed with the design of procuring a perfect parallel expansion, but they are so thin that they easily bend.

Although such instruments may occasionally be employed with success in the removal of stricture, they are nevertheless by no means adapted to supply the place of sponge-tents in cases where the cervix has not previously been prepared, and where the uterine cavity is to be rendered accessible to one or more fingers. Sponge-tents act principally by softening and relaxing the cervical tissue, and thus rendering it expansible, and in this respect they stand thus far unrivalled.

Sponge-tents are generally prepared from ordinary bathing-sponges, which are cut into cone-shaped pieces from five to six centimetres in length, and varying in thickness. A hot wire is then pushed lengthwise through the cone, and the sponge is soaked in mucilage (Bantock,⁹ however, regards the mucilage as unnecessary). The sponge is afterwards compressed by winding a fine thread tightly around it, commencing at the point of the cone. When the sponge is dry, the thread is

¹ *Annalen d. Entbind. zu Göttingen*, 1804, B. II., 2, p. 383.

² *Gynäkol.*, II., p. 286, T. III., Fig. 2.

³ *Gemeins d. Zeitschr. f. Geb.*, B. VI., p. 370.

⁴ *E. I.*, p. 549.

⁵ *Med. Times*, March 5, 1864.

⁶ *Amer. J. of Med. Sc.*, April, 1871, p. 395.

⁷ *New York Med. J.*, XI., 1870, p. 465.

⁸ *Archiv f. Gyn.*, B. V., p. 268.

⁹ *London Obst. Tr.*, XIV., p. 85.

removed and the wire is drawn out; the irregularities are finally polished off with sand-paper, and the tent is ready for use.

Sponge-tents may be made of any size (see Fig. 4); the English carbolized ones are the best prepared.

The bougies of *laminaria digitata*, the perennial stalks of the sea-tangle, which were first recommended by Sloan, in Ayr,¹ are superior to sponge-tents, in that they are much less likely to become offensive, and, by reason of their smooth surfaces, abrade the mucous membrane less; but they do not relax the cervix as well by far, neither do they expand as readily, and besides, they are not to be had of sufficient size; consequently they have never superseded the sponge-tent, notwithstanding the disagreeable qualities of the latter. According to Greenhalgh, hollow *laminaria* bougies are the best, because they swell quicker and better.

The *radix gentianæ*, which has recently been again recommended by Winkel,²

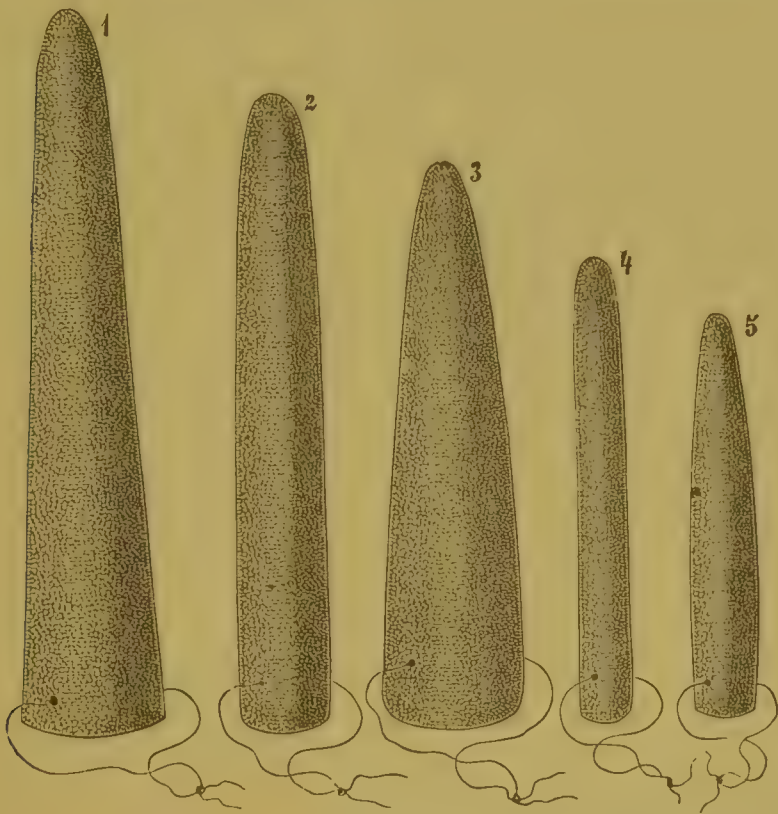


FIG. 4.
Various kinds of sponge-tents, of natural size.

has, we believe, no advantage over *laminaria*, excepting its greater cheapness. Decalcified ivory (which, after having been deprived of its inorganic constituents by

¹ Glasgow Med. J., October, 1862.

² Deutsche Klin., 1867, No. 29.

the action of acid, shrinks when dried, and when wet expands again) enlarges still less than laminaria.

The sponge-tent may be introduced through a speculum or it can be simply guided by the finger. In the former case it will be most convenient to employ Sims' speculum, with the patient in the lateral position. After the cervix has been exposed to view, the anterior lip is seized with a hook and drawn forward, which causes the external os to gape, and the tent is grasped with the forceps and passed into the cervical canal, until its point extends beyond the internal os into the cavity of the uterus.

With the cylindrical glass speculum the introduction of the sponge-tent is much more difficult, because the speculum pushes the cervix slightly upwards, and so is likely to produce a curvature at the internal os.

With a little dexterity the sponge-tent may also be readily introduced with the hand, underneath the bed-clothes. For this purpose we place the left index finger against the cervix, and push the tent along the finger into the vagina; the finger guides it into the external os, and if the position of the body of the uterus has been previously ascertained, and the base of the tent is pushed correspondingly backwards or forwards, as the case may be, it can be passed without trouble through the internal os. The other hand gives material aid by pressing the uterus down against the tent from without. The sponge-tent must not be greased all over, lest it expand too slowly; the point only should be smeared with solid fat (not oil).

It should be introduced rapidly, because the sponge quickly absorbs moisture, and when its point once becomes soft and swollen it is no longer possible to insert it.

Care should be taken not to push the sponge in too far, because (especially in nulliparous women) the external os is very liable to close over the tent and render its extraction very difficult. The sponge must be long enough, so that while it reaches beyond the internal os, it may project outside the os externum.

If the tent is retained in place for a short time with the finger after its introduction, a tampon will not be necessary, because the rapid imbibition of the sponge suffices to retain it in position; the laminaria, however, must be retained artificially.

The length of time during which a sponge-tent should be left *in situ*, and the frequency with which it should be replaced by a larger one, depend entirely on individual circumstances.

In women with wide, dilatable cervixes, who have borne children, and especially if retained placental fragments or other intra-uterine tumors have already dilated the internal os, a single sponge-tent introduced for a few hours frequently produces all the dilatation that is needed.

In a nullipara, however, with a firm, cartilage-like cervix and a narrow canal, the smallest sizes must be introduced first. In such cases it is advisable to begin with the slender laminaria bougies, which are easily introduced. It may become necessary to insert three or four sponge-tents in succession, each being a little larger than the previous one, until the cervix is sufficiently dilated, and more particularly until the resistance of the internal os is overcome.

Every sponge-tent should be removed after from eight to twelve hours, when it will already have acquired a decidedly offensive odor. After carefully cleansing the vagina and cervix by warm-water injections, an examination is made, and then, if necessary, a larger tent is introduced, and so on until the cervix has been sufficiently dilated to permit the easy introduction of the finger into the cavity of the uterus.

The sponge is removed by the hand, simply by loosening it in the cervix with the finger, and then extracting it, by the thread which is attached, as soon as it readily yields to the traction.

Beneficial and useful as the sponge-tent is, it is nevertheless attended with various dangers.¹

Under all circumstances the introduction of a sponge-tent causes an irritation of the uterus and its immediate surroundings; sometimes the irritation is mechanical, and sometimes a source of danger is presented in the rapid decomposition of the secretions absorbed by the sponge, for which reason, very soon after its insertion, it acquires a fetid odor. (According to Law-

¹ See *Aitken*, Edinb. Obst. Tr., vol. II., p. 185; *von Gruenewald*, etc., in the *Tagebl. d. Rostocker Naturforschervers*, 1871, p. 156; *Storer*, Boston, Gyn. J., III., p. 12; *Zschiesche*, Dissert. in Greifswald, 1873.

son Tait, *Med. Times*, Jan. 10, 1874, sponge-tents impregnated with a five-per-cent. solution of oil of cloves do not become offensive.)

Even a healthy uterus may become inflamed by the irritation of the tent; but of course a fresh inflammatory action is induced much more readily when metritis or perimetritis, although in a chronic form, exists beforehand.

This measure, therefore, can never be regarded as perfectly harmless, and should always be undertaken with certain precautions. The sponge-tent ought never to be introduced at the office of the physician, but always at the patient's house, and while she is in bed, where she should also remain afterwards. The existence of inflammation contraindicates the use of the sponge-tent, although cases may occur in which the urgency of the symptoms necessitates dilatation of the cervix, irrespectively of this danger.

The mucous membrane of the cervix is always considerably injured, but evil results do not generally ensue therefrom; indeed, occasionally, the pressure of the sponge-tent upon the mucous membrane of the cervix, in its chronic hyperplastic condition, exerts a decidedly beneficial influence.

Extreme danger may arise from the absorption of the products of decomposition, which advances rapidly under the action of the sponge-tent, and may result in pyæmic and septic infection; this absorption is most likely to occur when the sponge is introduced immediately after a bloody operation (incision of the external os).¹ Thomas² reports a case of tetanus which occurred twenty-four hours after the removal of the second sponge, and another case of fatal tetanus is related by Thompson.³

EXAMINATION BY INSPECTION.

The examination of the abdomen by ocular inspection is not unimportant in the case of large abdominal tumors, although no particularly valuable diagnostic points are gained by it as a

¹ See *Olshausen*, *Samml. kl. Vortr.*, No. 67, p. 503.

² *Diseases of Women*, 3d ed., Philadelphia, 1872, p. 91.

³ *Columbia Hosp. Report*, Washington, 1873, p. 102.

rule. Under favorable conditions, however, the presence of free fluid in the abdominal cavity may be distinguished from encysted fluid by the flattening of the external surface; the distended bladder, also, when an abdominal tumor lies behind it, forms a spherical protuberance, which, from its shape, may be recognized simply by the naked eye.

Ocular inspection of the vulva frequently furnishes important information, and is often indispensable. An accurate idea of the condition of the labia, frenulum, clitoris, meatus urina-rius, and hymen, can be obtained only by this method of examination.

Of still greater importance is the examination by sight of the vagina and vaginal portion of the cervix by means of certain specially adapted instruments.

The instruments of this sort—uterine, or better, vaginal specula—are of great variety.

Carl Mayer, Verh. d. Berl. geb. Ges., VII., 1853, p. 79.—*Louis Mayer*, M. f. Geb., B. 18, p. 11.—*J. M. Sims*, Amer. J. of Med. Sc., January, 1852, and Notes on Uterine Surgery. New York, 1871, p. 10.—*G. Simon*, Ueber die Operation der Blasenscheidenfistel, etc. Rostock, 1862, p. 62.

There are three kinds of specula: the valvular, or those composed of several blades, the cylindrical, and those which consist of several parts, which are disconnected, and must be held separately.

Formerly the valvular specula were chiefly used, of which we will mention only the bivalvular speculum of Ricord, and the very convenient instrument of Cusco (Fig. 5). Specula with three and four valves were devised by Ségalas, Charrière, and others.

These valvular specula are introduced closed into the vagina, and then opened by means of various mechanical contrivances. The advantage which they possess of easily passing the

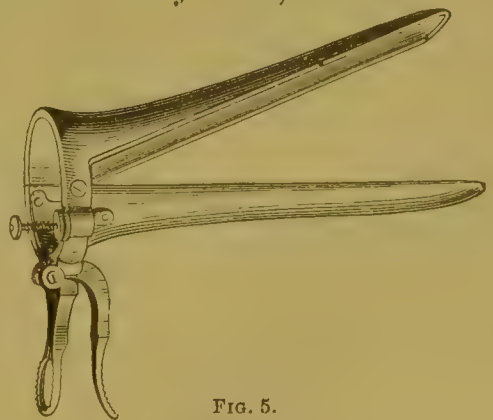


FIG. 5.
Cusco's speculum.

entrance of the vagina by reason of their small size, and thus causing no pain, is compensated by their liability to catch the folds of the vaginal mucous membrane on being withdrawn. Besides, if the cervix does not present itself at once, it is not easy to search for it with these instruments, and, moreover, they reflect the light imperfectly. For these reasons, and because they are difficult to clean, they are now but little used.

Cylindrical specula are made of various materials—metal, wood, ivory, hard rubber, glass, porcelain.

Outside of Germany, Fergusson's speculum (Fig. 6) is most used; in Germany, Mayer's milk-colored glass speculum (Figs. 7 and 8).

Fergusson's speculum is a tube of glass, which is first silvered, and then covered with rubber varnish.

Mayer's speculum consists simply of milk-colored glass or

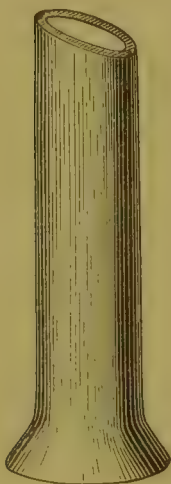


FIG. 6.
Fergusson's speculum.



FIG. 7.
Straight milk-glass speculum.

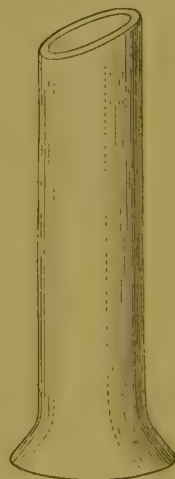


FIG. 8.
Obliquely cut milk-glass speculum.

porcelain. Both have a funnel-shaped expansion at one end, and are cut off straight or obliquely at the other.

These specula have the advantage of being very easily cleaned, of not being acted upon by medicinal agents, and of giving a very good light. The cervix is very easily brought into the lumen of the speculum, even when dislocated backwards, and particularly so with the obliquely cut instrument, for which reason this variety has commended itself to general use. The

straight-cut specula exert a uniform pressure upon all points of the fornix vaginæ, and are therefore useful when it is desirable to produce an ectropion of the lips of the os, in order to gain a good view of the cervical canal. The alleged disadvantage of their introduction being very painful disappears almost entirely if they are skilfully manipulated.

On introducing the speculum, we should remember that the sensitiveness of the frenulum and perineum is very slight, and that these parts are capable of considerable distention, whereas the anterior vaginal wall, at its attachment to the symphysis, and the eminentia urinaria are exceedingly tender.

There are various ways of avoiding these sensitive parts during the passage of the instrument. While the index finger and thumb of one hand separate the labia, the speculum may be introduced by placing its upper edge, or tip, in the vagina under the meatus urinarius, and then slipping the lower edge rapidly over the fourchette; or, as I prefer, the bevelled tip is pressed against the fourchette and posterior vaginal wall, and the perineum sufficiently depressed to easily admit the whole calibre of the speculum without touching the sensitive urinary caruncle. In this manner even very large specula may be passed through the vaginal sphincter with much less pain than if we follow the clumsy, boring method of introduction by means of a wooden plug fitted into the speculum.

As the speculum is pushed further up with a twisting motion, the anterior and posterior vaginal walls are seen to separate until their points of junction with the cervix are reached. Usually the latter is easily found, especially with the bevelled-tip instrument; difficulty is rarely experienced, excepting in anteversion, when it may become necessary to introduce the sound first, and then pass the speculum over it.

Every physician should have an assortment of milk-glass specula, of different sizes, to correspond with the variations in size of the vaginal entrance. In multiparous women a speculum of the largest size can generally be introduced without causing much pain.

Specula are generally made too long. The shorter the speculum, if it answer the purpose, the easier will it be to manipulate through it; beginners frequently experi-

ence difficulty in finding the cervix, owing to the circumstance that they have already pushed the tip of the speculum beyond the vaginal portion of the cervix, into the vaginal cul-de-sac. Thomas¹ has devised a special "telescopic speculum," which can be lengthened or shortened as desired.

We especially warn our readers against the funnel-shaped, milk-glass specula, which are now frequently exposed for sale; the upper end is so narrow as to give only a very small field of vision, and the supposed greater ease of introduction is so slight an advantage that only perfectly cylindrical instruments should be manufactured.

Recently other specula have been introduced into practice, which unquestionably facilitate the approach to the cervix and vault of the vagina vastly beyond any of those already mentioned.

Sims was the first to describe the "duck-bill" speculum, now known by his name (Fig. 9), by means of which merely the posterior wall of the vagina is depressed. The instrument cannot be used advantageously in the dorsal decubitus; but in the lateral position, and still more in the knee-and-elbow posture (*à la vache*), the abdominal organs fall away from the pelvic inlet by gravitation,

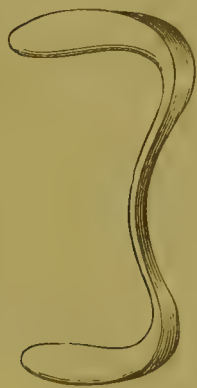


FIG. 9.
Sims's speculum.

in consequence of which the anterior wall of the vagina is prevented from following the posterior when the latter is retracted by the speculum, and hence the vagina gapes open. Yet even in this position a small instrument is almost always needed to assist in holding the anterior wall back.

Inasmuch as the employment of Sims's speculum absolutely requires a change from the dorsal to the lateral decubitus, and renders the presence of an assistant necessary to hold the speculum in place, its use is scarcely likely to become general in Germany, where it is customary for the physician to be alone with his patient during a gynecological examination. Indeed, it can readily be dispensed with in ordinary cases, where it is only desired to obtain a view of the cervix.

If the object is to expose the whole upper portion of the

¹ Diseases of Women, 3d ed., p. 75.

vagina, for the purpose of a clear inspection or of an operation, we confess our preference for the specula of Simon (Fig. 10), which separate the vaginal walls in all directions, and are equally applicable in the dorsal position,—a point of particular importance as regards the administration of an anæsthetic.

These specula consist of a concave blade, *c*, for the posterior vaginal wall, similar to that of Sims; of a plate, *b*, for the support of the anterior, and of two flat steel hooks, *a*, for the separation of the lateral vaginal walls. The two former may be constructed of different sizes, which may be made to fit the same handle. At least two assistants are required to hold them.

In order to dispense with the assistants, similar specula

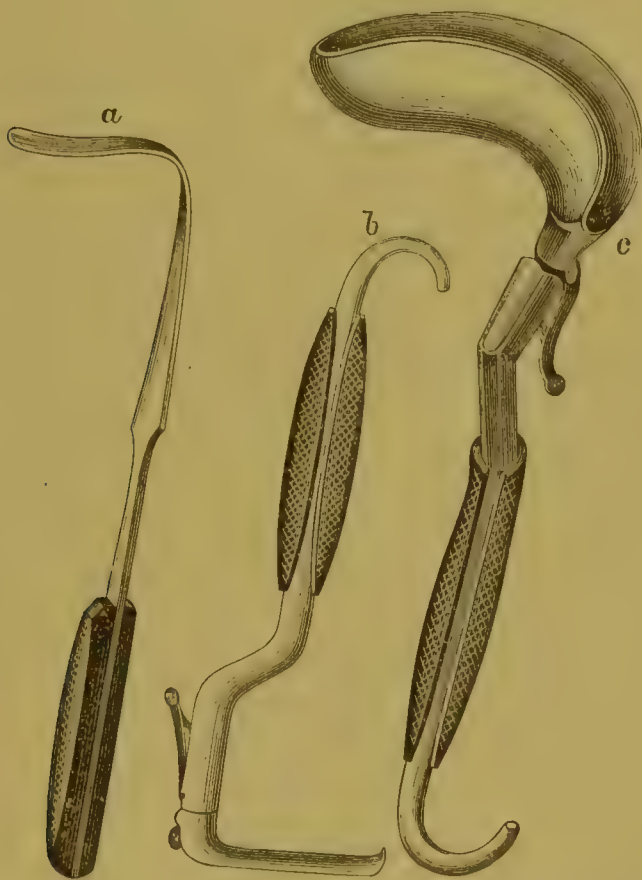


FIG. 10.

Simon's specula. *a*, lateral hooks; *b*, plate-shaped speculum for the anterior vaginal wall; *c*, concave gutter-shaped speculum for the posterior vaginal wall.

have been constructed, which are designed to be self-retaining. Emmet, Foveaux, Pallen, Nott, Thomas, Hunter, Souchon, and

Spencer Wells have devised such modifications, but they have never come into general use.

The English, and especially the Americans, are indefatigable in the invention of new specula, of which the most important have been devised by the following persons :

Meadows (Lancet, May, 1870); Blackbee (Lancet, December 9, 1871, p. 320); Albert Smith (Med. Press and Circular, December, 1869); Byrne (Amer. Jour. of Obst., IV., p. 287); Stockton-Hough (Boston Gyn. J., VI., p. 18); Brown (Boston Med. and Surg. Jour., July, 1869); Erich (Phila. Med. and Surg. Reporter, March 27, 1869).

The apparatuses for artificial illumination recommended by Ploss,¹ Tobold,² and Sedgwick³ are not likely, for obvious reasons, to find many supporters. The full daylight is necessary to a specular examination, but this is all that is required.

DISEASES OF THE UTERUS.

Malformations.

Kussmaul, Von dem Mangel u. s. w. der Gebärmutter. Würzburg, 1859.—*Fürst*, M. f. Geb., B. 30, p. 97.—*Heppner*, Petersburger med. Z., 1870., I., p. 193.—*Schatz*, Archiv f. Gyn., I., p. 12, and II., p. 289.—*Churchill*, Obst. J. of Great Britain, July, 1873, p. 256.

The female genital canal, from the entrance of the vagina to the ostium abdominale, is formed out of two, originally separate, parallel tubes, called Müller's ducts. These coalesce in the eighth week of embryonic life, so far as they go to form the uterus and vagina; while those portions which go to form the Fallopian tubes remain separate. *The boundary-line between these two portions is always distinctly marked by the point of origin of the round ligaments.* The coalescence commences in the middle, the two vaginal segments becoming merged rapidly into one, the two uterine more slowly.

¹ M. f. Geb., B. 14, p. 271, and 19, p. 466.

² M. f. Geb., B. 18, p. 6.

³ Lancet, April 24th, 1869.

The absence or early atrophy of one or both of Müller's canals, and the complete or partial failure of these canals to coalesce, give rise to various defects of development, which we shall now proceed to discuss in regular order.

*Entire Absence and Rudimentary Development of the Uterus.
Uterus bipartitus.*

Kussmaul, l. c., p. 43.—*Fürst*, Mon. f. Geb., B. 30, p. 119, 128.—*Schröder*, Scanzoni's Beitr., B. V., p. 348.—*Heppner*, Petersb. med. Z., 1870, B. I., p. 197.—*Warner*, Boston Gyn. J., IV., p. 339, and VI., p. 1.

The forms of mal-development which are designated in the above heading are considered together, because practically they have the same significance, and a differential diagnosis during life is scarcely possible. The following forms are met with:

a. Complete absence of the uterus. The rectum and bladder are in immediate relation to each other, the round ligaments disappear in the connective tissue between those two organs, and no trace whatever of a uterus can be detected by the most careful examination. Such cases are exceedingly rare. If the ovaries also are wanting, the individual is, strictly speaking, without a gender.

b. A rudimentary uterus without a cavity may exist. This rudiment may sometimes simulate the normal form of the uterus, but lateral horns usually project from that portion which is to be regarded as the cervix (Fig. 11). In some cases we find only a bow-shaped rudiment extending from one side to the other (Fig. 12); the cornua are present, but the cervix is wanting.

c. We may have a rudimentary uterus with a cavity. It may be a hollow, cystiform, membranous body, which in shape resembles the normal uterus. But a more common form is the *uterus bipartitus*, a name not well chosen, to be sure, but one which is now generally adopted for this malformation. A uterus bipartitus (Fig. 13) consists of a simple solid cervix, with separate horns, each of which contains a small cavity lined with mucous membrane.

Practically, all these malformations do not essentially differ

from one another. The ovaries are either wanting or present, and in the latter case they may contain Graafian follicles. Men-

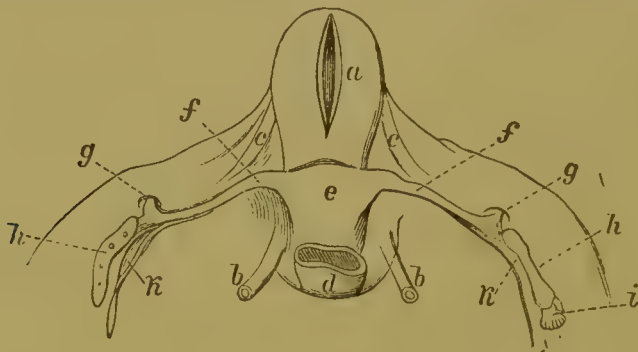


FIG. 11.

Solid rudimentary uterus, consisting of one cervix and two horns, after Förster (see Kussmaul, p. 66).

a, bladder cut open; *b b*, ureters; *c c*, umbilical arteries; *d*, rectum; *e*, cervix; *f f*, cornua of the uterus; *g g*, round ligaments; *h h*, ovaries with follicles; *i*, rudiment of the Fallopian tube; *k k*, peritoneal duplicature of the ovaries.

struation is always absent, and generally also the molimina. The vagina is absent, or ends in a short, blind pouch, whilst the external genital organs are normal, and the pubes often well developed.

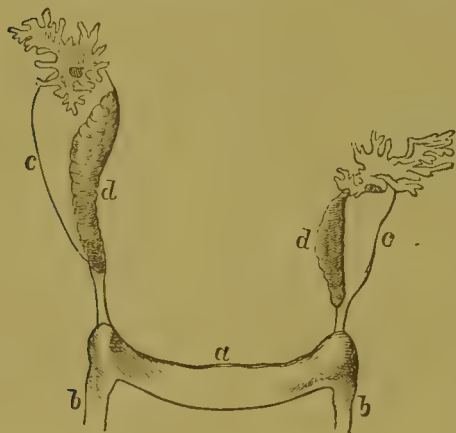


FIG. 12.

Bow-shaped rudiment of the uterus, after Nega (see Kussmaul, l. c., p. 64).

a, rudimentary uterus; *b b*, round ligaments; *c c*, tubes; *d d*, ovaries.

The absence or rudimentary development of the uterus does not necessarily constitute a virago; the figure, voice, inclinations, and temperament may be entirely feminine, and even the mammæ may be well developed, notwithstanding the fact that the ovaries are entirely absent.

It is not at all a rare thing to find such women married, or practising illicit sexual inter-

course. In consequence of the persistent efforts of the husband or lover, either the rudimentary vagina becomes deepened, until it is capable of receiving at least a portion of the penis, or else the urethra becomes gradually dilated and is made to take the place of a vagina during connection.

It is important that the diagnosis of these malformations

should be made during life. This may be done by means of a careful bimanual examination; but, since this is impossible through the vagina, excepting in rare cases and in a very unsatisfactory manner, it must generally be made through the rectum. One or two fingers are introduced, and between them and the external hand the entire true pelvis is thoroughly explored. Unless the conditions are peculiarly unfavorable, we may then assert positively, if we have found no womb, that the uterus is lacking, or that only an insignificant rudiment of it exists. The introduction of the catheter into the bladder, with counter-pressure upon the parts from the rectum,—a procedure which has been so highly recommended—is decidedly less

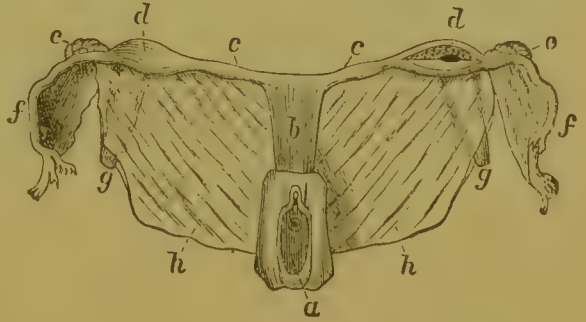


FIG. 13.

Uterus bipartitus, after Rokitsansky (see Kussmaul, p. 71).

a, closed vagina; *b*, cervix uteri; *c c*, cornua of the uterus; *d d*, hollow expansion of the cornua; *e e*, atrophied ovaries; *f f*, tubes; *g g*, round ligaments; *h h*, broad ligaments.

satisfactory in its results than the method by conjoined manipulation. In some cases, however, the finger may be passed through the urethra (when it has been dilated by coition) into the bladder,—there is generally no incontinence associated with this condition—and a bimanual examination may then be very advantageously practised through the bladder and the rectum. The diagnosis may be very difficult, if, while nothing is felt in the median line, certain small, round bodies are detected at either side; for these may either be the ovaries, the uterus being wanting, or the expanded ends of the horns of a uterus bipartitus.

Treatment in all of these cases is, of course, out of the question.

However strange it may seem, it is nevertheless a fact, that non-development of the uterus is not unfrequently hereditary, that is, repeats itself with relative frequency in the same family. Squarey¹ relates the case of three sisters of twenty-six, eighteen, and sixteen years of age respectively, none of whom had any uterus. The mother of these three sisters had a sister who never menstruated, and three sterile

¹ London Obst. Tr., Vol. XIV., p. 212.

aunts. Phillips, in this connection, reports an instance of two sisters in whom the uterus was wanting. Hauff¹ made the autopsy of a person, fifty-one years of age, with feminine corporeal development, who had neither uterus, tubes, nor ovaries. The external genital organs were like those of a child ten years of age; the clitoris only (she had practised masturbation) was well developed; the entrance to the vagina was closed. Two sisters of this person have large and finely formed daughters, of twenty-eight and twenty-three years of age respectively, whose generative organs are similarly defective, and who are entirely devoid of sexual appetite.

Uterus unicornis, with or without a rudimentary horn of the opposite side.

In the uterus unicornis the duct of Müller of one side is either entirely wanting or imperfectly developed, while that of the other side is formed normally; but the two ducts have failed to coalesce.

The one-horned uterus consists of an oblong cylindrical body narrow in proportion to its width, that terminates above in a tolerably sharp point, which is curved to one side. From the tip of the laterally inclined cornu, the tube and other uterine appendages take their origin.

The uterus unicornis is somewhat imperfectly developed. There is no actual fundus, the cervix is longer and thicker than the body, the intravaginal portion is generally small, and the vagina narrow.

The other horn may be entirely wanting (in which case the uterine appendages on that side are also absent or merely rudimentary), or it may be present, showing various grades of development, from a thin ribbon of muscular fibres to a small, hollow body communicating with the other horn.

The ribbon-like rudimentary horn begins in the vicinity of the internal os, and extends upwards and outwards, terminating not unfrequently in a hollow expansion. It is occasionally of a remarkable length (in certain specimens in the Erlangen Pathologico-Anatomical Museum it is as long as from ten to fifteen centimetres). The ovary also of this side may be very much

¹ Würtemb. Corresp.-Bl., 1873, 43, 5; see Schmidt's Jahrbücher, 1873, Bd. 158, p. 140.

elongated, sometimes to the extent of seven centimetres (Fig. 15). It is rare that the ovary of the well-developed horn is the longer of the two (Fig. 14). The opposite rudimentary cornu in these cases is largest near the origin of the round ligament, which

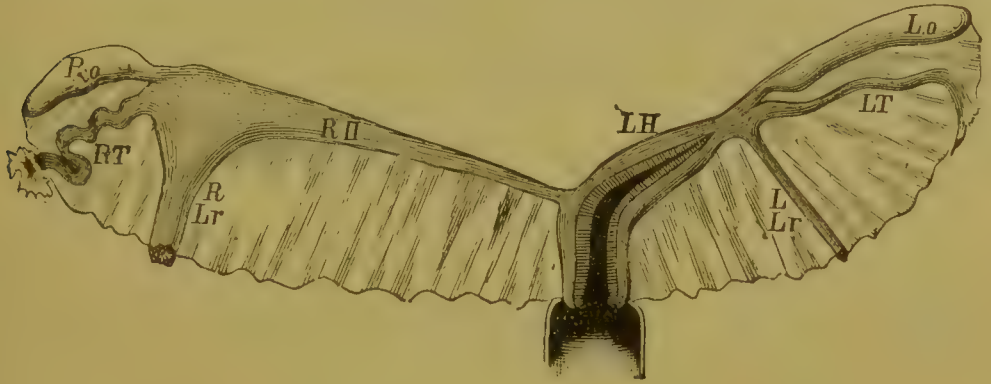


FIG. 14.

Uterus unicornis, with rudimentary cornu, from a specimen in the Erlangen Pathologico-Anatomical Museum.

LH, LO, LT, and LLr, horn, ovary, tube, and round ligament of the left side; RH, RO, RT, and RLr, those of the right side.

shows an unusual development. The tube of the rudimentary side may be very much deformed; it may consist of a very short cord, which is situated externally to the ovary, and entirely separate from the uterus, its uterine end terminating with a free, blind extremity.

The uterus unicornis is not necessarily accompanied by any

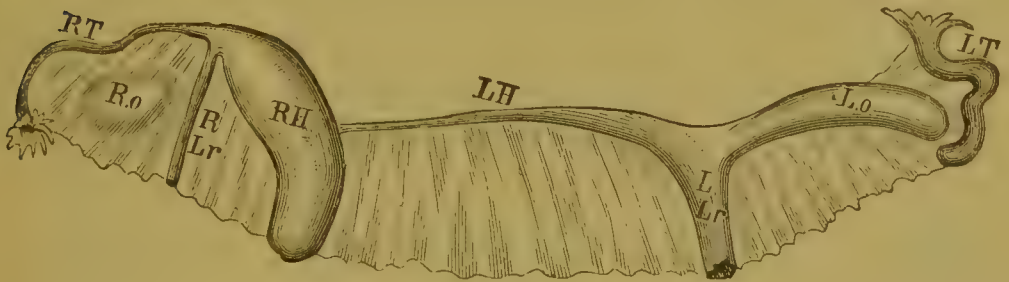


FIG. 15.

Uterus unicornis, with rudimentary cornu, from a specimen in the Erlangen Pathologico-Anatomical Museum.

Letters the same as above.

derangement of the sexual functions. Menstruation is perfectly normal, and conception may take place either in the normally developed horn or in the rudimentary one (if it is hollow). In the former case the pregnancy pursues its regular course; in the

latter, rupture, with the usual fatal consequences, ensues, sometime between the third and six month.

The *diagnosis* of this malformation is difficult. It may be made, however, if we find the vagina narrow and the cervix small, and a careful conjoined examination shows us that the slender-pointed uterus is bent in an unusual degree towards one side. If a cord or a spherical body is discernible on the other side, it may be regarded as the other rudimentary horn.

Uterus duplex.

Duplication of the uterus occurs when the two ducts of Müller are well developed, and their coalescence has either not taken place at all or only in an imperfect manner.

Without here considering the *uterus duplex separatus* or *didelphys*, in which the two uteri are entirely separate from each other, and which occurs almost without exception in non-viable malformed foetuses,¹ we distinguish two forms of this malformation, viz., the uterus bicornis and the uterus septus, according as the external aspect of the uterus shows two cornua or is normal.

Uterus bicornis.

The uterus bicornis may be wholly or only partly double.

In the former case, in the uterus bicornis duplex, the uteri are contiguous to a greater or less extent. If the cervices alone

¹ Recently several cases of uterus didelphys in adult women have been reported. One is described by *Heppner* (l. c., p. 202), and occurred in an adult woman whose previous history was unknown. Both uteri were solid, while the tubes and ovaries were nearly normal; in the latter, there were found Graafian follicles and corpora lutea. More interesting still is the case of *Ollivier* (Gaz. de Paris, 14, 1872; see Schmidt's Jahrb., 1873, B. 158, p. 44), which was met with in a post-mortem examination of the body of a woman, forty-two years of age, who had borne six children. The two uteri were separated by a tolerably wide interval, which contained folds of intestine. Both vaginae were also completely separate. *Ollivier* cites a similar case, observed by *Le Fort* (Des vices de conformation de l'utérus et du vagin, etc., Paris, 1863, p. 47), which occurred in a woman twenty-five years of age.

are united, the bodies diverge at an acute angle; if the point of union is situated higher up, the angle becomes more acute.

If the duplication is incomplete, the cornua may still diverge from points in the vicinity of the internal os. The cervical canal is then common to both (Fig. 16), or the septum is prolonged more or less into the former. If the cornua diverge farther up, a septum may also extend into the uterine cavity, or it may be wanting. In the latter case the division of the uterus into two horns is indicated only by a depression in the middle of the fundus (*uterus arcuatus*); such a uterus constitutes the slightest form of deviation from the normal arrangement.

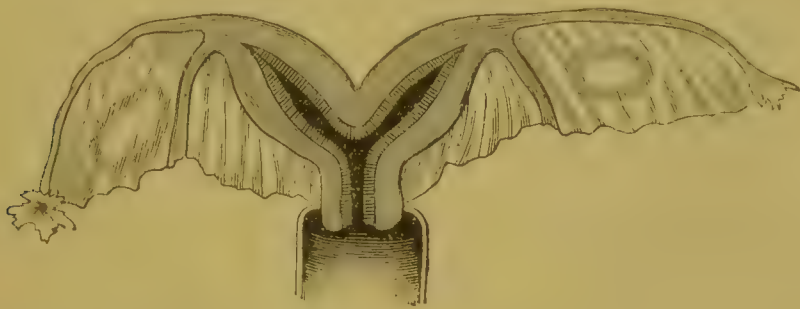


FIG. 16.

Uterus bicornis unicollis, from a specimen in the Erlangen Pathologico-Anatomical Museum.

Occasionally we find a fold of peritoneum extending from the posterior wall of the bladder to the anterior surface of the rectum, separating the two cornua of the uterus bicornis. The significance of this fold has not yet been definitely ascertained; perhaps it is simply the result of a union of the two portions of the peritoneum during foetal life, and this union may either have been the cause of the defect of development, or it may have occurred merely because it is only possible with this particular malformation. A genetic connection, such as has been surmised to exist between this fold of peritoneum and the remnants of the allantoic canal, is improbable.

Uterus septus.

In this deformity (Fig. 17) the externally normal uterus is divided by an internal longitudinal septum into two halves, and the division may be either total or partial. The septum occasion-

ally reaches only to the internal os, or but a short distance into the cavity of the body of the uterus (*uterus subseptus*). A divided cervix and double external os is very rarely associated with a single uterine cavity.

In both uterus bicornis and uterus septus the vagina may be either single or double. The ostium vaginae is surrounded by a normal vulva, and may be occupied by a single or a double hymen.

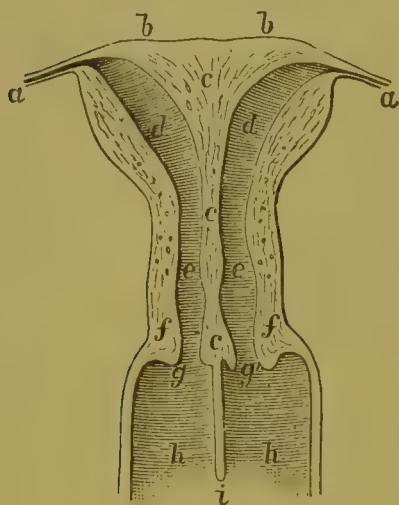


FIG. 17.

Uterus septus, after Kussmaul, p. 187.

a a, tubes; *b b*, fundus uteri; *c c c*, septum; *d d*, the cavities of the two uteri; *e e*, internal os; *f f*, external wall of the two cervixes; *g g*, external orifices; *h h*, vaginae.

The sexual functions in both these forms of duplication of the uterus are normal. The menstrual flow comes sometimes from one, sometimes from both uterine cavities. Generally only one of the two vaginae serves for coition, though conception may take place in either half, and delivery occur at full term.

The *diagnosis* of these anomalies is sometimes easy and sometimes difficult. A double os is easy of detection when it opens into one vagina; a double vagina, however, may readily be overlooked. Again,

we may find a double os, and still the uterus above may be single, even (as shown in the case of Corazza)¹ when the vagina, too, is double.

If the vagina and external os are single, a uterus bicornis may be diagnosticated by means of conjoined manipulation, whereas a uterus subseptus cannot be recognized unless the cavity of the uterus is naturally large, or is rendered so by artificial dilatation.

Uterus foetalis and infantilis.

Kussmaul, l. c., p. 79.—Sävinger, Prager Vierteljahrschrift, 1866, B. 1, p. 107.

If during foetal life the uterus is normally formed, but its development is arrested at the time of birth or during infantile

¹ Schmidt's Jahrb., B. 148, p. 148.

life, and the organ remains afterwards in this primitive condition, the anomaly is designated as *uterus fœtalis* or *infantilis* (see Fig. 18).

Since the uterus remains almost unchanged from birth till the approach of puberty, these two forms hardly differ from each other. The only change which the uterus undergoes during this period is the following: the plicæ palmatæ, which in the fœtal uterus extend as far as the fundus, disappear from the cavity of the body of the womb, and merely a longitudinal fold is left in their place.

This form of uterus is characterized by the disproportion existing between the body and the cervix. The length of the body constitutes only from one-fourth to one-third of its whole length, and the walls of the body are poorly developed, often merely membranous, whilst the cervix is supplied with a thick muscular coat. The length of the whole uterus is generally not more than four centimetres (about an inch and a half); the intra-vaginal portion is small; the os narrow.

The ovaries may be either rudimentary or entirely wanting, but generally they are infantile in character; ovulation is absent, even though Graafian follicles are present.

The vagina is short and narrow; the external genital organs, as well as the pubes, are poorly developed; the mammæ are small and flat. Menstruation is always absent in typical cases.

The *diagnosis* may be made when, in connection with a narrow and short vagina and a small vaginal portion of the cervix, we detect by conjoined manipulation an unusually small, flabby uterus, the thickest part of which is the cervix. The external os is frequently so narrow as to require the use of a fine sound to ascertain that the cavity of the uterus is only three, or at most five centimetres in length. The tip of the sound can usually be felt with surprising distinctness through the thin fundus by the hand pressing upon the abdomen.

Neither the fœtal nor the infantile variety is amenable to

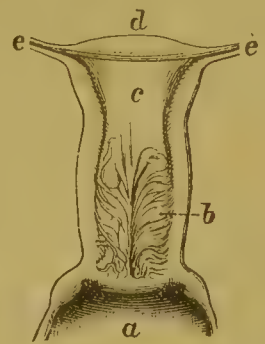


FIG. 18.
Uterus infantilis, after Kussmaul, p. 88.

a, vagina; b, cervix; c, body; d, fundus; e e, tubes.

treatment; therefore, so soon as the diagnosis of the anomaly has been made with certainty, it is best for both the physician and the patient to abstain from all therapeutic attempts.

Congenital Atrophy of the Uterus.

Kivisch, *Klin. Vortr.*, etc., 4 Aufl., B. I., p. 142.—*Scanzoni*, *Lehrb. d. Krankh. d. w. Sex.*, 4 Aufl., B. I., p. 80.—*Sävinger*, l. c., p. 109.—*Virchow*, *Berl. Beitr. z. Geb. u. Gyn.*, I., p. 360.

This variety of arrested uterine development (Fig. 19) is characterized, in contradistinction to the infantile womb, by the shape of the uterus, which is essentially normal; the cervix does not preponderate materially over the body, although the whole uterus is small and its walls are thin and flabby.

The other generative organs may either be tolerably developed or also atrophic.

Primary atrophy of the uterus may occur in girls who are backward in their development in other respects; also, the arrest of development may be so considerable that girls of twenty or more years appear like mere children. It is sometimes induced by the scrofulous and tubercular diatheses, but is most fre-



FIG. 19.

Primary atrophy of the uterus, after Virchow.

quently owing to chlorosis, in connection with congenital atrophy of the heart and large arteries. Congenital uterine atrophy may, however, occasionally occur in girls who are perfectly healthy and otherwise well developed.

In the majority of cases there is complete amenorrhœa ; even the menstrual molimina being generally absent. In that variety which is due principally to chlorosis, the menses may, however, be present, and harassing symptoms in the generative organs, pain in the back and abdomen, hysterical paroxysms, and mental disturbances frequently accompany it. In one case, with complete amenorrhœa, which came under my observation, the patient became epileptic, and soon lost her mental faculties. (See Lawson Tait, *Obst. J. of Great Britain*, Vol. I., pp. 94 and 173.)

The *diagnosis* is possible only by means of careful conjoined manipulation. If the intravaginal portion is quite small, and the os narrow, if the sound shows a considerable shortening of the cavity of the uterus, and if the walls of the whole uterus, including the cervix, are thin and flabby, the case is to be regarded as one of atrophy, and not of arrested development.

Treatment is most hopeful in those cases which are dependent on general debility, and particularly on chlorosis. By means of good nutrition and the preparations of iron the cases of this class may often be entirely cured. Local irritation, by means of hip-baths and douches, by the application of leeches to the vaginal portion of the cervix or by scarification of this part, by the use of the sound or the introduction of intra-uterine pessaries, is far less efficacious than the tonic method of treatment alluded to above. The influence of electricity has not as yet been sufficiently tested.

ATRESIA OF THE UTERUS, THE VAGINA OR THE VULVA.—HÆMATOMETRA.—HYDROMETRA.

Meissner, *Frauenzimmerkrankheiten*. Leipzig, 1843, B. I., p. 554, and II., p. 66.—*Seyfert*, *Prager Vierteljahrschrift*, 1854, I., p. 132.—*Bernutz et Goupil*, *Clin. méd. sur les maladies des femmes*, T. I. Paris, 1860.—*Carl Braun*, *Wiener allg. med. Z.*, 1861, No. 53.—*Hennig*, *Zeitschr. f. Med., Chir. u. Geb.*, 1866, B. 5, pp. 22 and 91.—*Klob*, *Pathol. Anat. d. weibl. Sex.* Wien, 1864, pp. 37, 108, 114, 120.—*Puech*, *De l'atrésie des voies génératives de la femme*. Paris, 1864.—*Raciborski*, *Traité de la menstruation*. Paris, 1868, p. 526.—*Rose*, *Mon. f. Geb.*, B. 29, p. 401.—*Müller*, *Scanzoni's Beiträge*, B. V., p. 67.—*Copeman*, *London Obst. Tr.*, Vol. X., p. 246.—*Steiner*, *Wien. med. W.*, 1871, Nos. 29 and 30.

We include here all the cases in which the genital canal is occluded at some spot, thereby preventing the exit of the menstrual blood exuded from the uterine mucous membrane. A combination of symptoms is thereby produced, which renders it necessary that the various kinds of genital atresia should be considered collectively.

Etiology and Pathological Anatomy.

The atresia may be congenital or acquired.

Congenital Malformations.

Malformations of this kind do not occur at the vulva, for although adhesion of the labia may be congenital, it is always an accident of intra-uterine life, and not a product of defective development.

The *atresia of the hymen* is probably one of the most frequent causes of hæmatometra.

The orifice of the hymen is extremely variable in size. Although it is generally large enough only to admit the finger, with more or less difficulty, into the vagina, it is occasionally so capacious that the hymen is not torn in coition, even if some violence is used. In cases of not extreme rarity, the opening is so small as to admit only a fine sound, thus precluding manual exploration of the vagina. The rarest cases, but practically also the most important ones, are those in which there is no opening whatever; as a rule, the membrane then is thicker and more rigid than usual, and occasionally quite cartilaginous.

Vaginal atresia is not uncommon, and occurs in various forms.

1. The vagina may be entirely absent, the other genital organs being normal, or,

2. The vagina may be partially wanting. Both conditions depend on the obliteration of the ducts of Müller, either throughout the entire portion from which the vagina is formed, or throughout a limited extent. There may also be, however,

3. A transverse septum in the vagina, which completely closes the canal at that spot.

This occurs most frequently at the lower end, immediately behind the hymen, and is of embryonic origin. Unfortunately the process of development of the hymen, that is to say, the manner in which the genital canal opens into the urogenital sinus, is not yet sufficiently understood. If, as Kölliker supposes, the hymen is nothing else than a transformation of the original thickened spot at which the canal opens into the urogenital sinus, the frequency of vaginal atresia at this spot (above the hymen) would not be easy to explain.

Many facts besides this, however, point to the probability that the hymen is a newly formed valve, and that Müller's ducts open into the urogenital sinus immediately above the hymen. Of the same character also is the formation, directly above the hymen, of a second circular ridge, which is very frequently present, and, when well developed, has been described as a double hymen.

Supposing this to be the case, the frequency of vaginal atresia immediately behind the hymen could easily be accounted for.

Probably this form of atresia is much more common than is generally supposed, because it may be easily mistaken for atresia hymenalis. The occluding membrane is pressed by the accumulated blood so closely against the hymen, that the latter is overlooked ; indeed, in one case I found such a perfect union of the two membranes, that only on a very careful examination was I able to discover the originally free border of the hymen on the surface of the occluding membrane. On the other hand, an atresia hymenalis, in which the hymen has been pushed deep into the vagina by the persistent attempts at coition, may be taken for vaginal atresia.

If the occluding membrane is situated higher up, the malformation must, as a rule, be considered the consequence of the development of only one of Müller's ducts in the upper portion of the vagina, and of the other only in the lower portion. The two ducts may then run parallel to each other for some distance.

Congenital uterine atresia is far less frequent.

Usually the external os is closed, the occluding tissue being either the vaginal mucous membrane or muscular and connective tissue. Very rarely is the whole cervix found imperforate,

in which case its intravaginal portion is very small, or entirely absent, and the vagina also is in a rudimentary condition.

It is natural to suppose that occasionally several atresia may occur, one above the other. Charrier¹ and Thompson² each observed one case, in which the division of the atresia at the ostium vaginae was followed only by a small quantity of viscid fluid, the discharge of the retained blood not taking place until a second septum higher up had been perforated. Other similar cases are reported by Ruysch, Schultz, Walther, Burns, Butler, Picard, Nélaton.³ Steiner⁴ relates a case operated upon by Billroth, in which congenital atresia of the upper portion of the vagina was complicated with an acquired occlusion of the ostium vaginae.

Acquired Atresia.

The not uncommon adhesion of the labia majora in little girls, does not lead to hæmatometra, inasmuch as the vagina is not completely closed thereby.

In the ostium vaginae and the vagina itself occlusion may occur in consequence of cicatricial contraction. The latter may be due to ulceration (Thomas⁵ observed vaginal atresia after syphilis) or to gangrenous processes. The gangrene may arise spontaneously from scarlatina, small-pox, cholera, typhoid fever, but is most common following confinement. Complete occlusion, moreover, may occur after injuries (rape), and therapeutical measures (injections of strong acids, cauterization, the actual cautery). Atresia produced in this manner are generally situated in the upper part of the vagina, near the cervix; Müller (l. c.), however, very properly calls attention to the frequency of acquired utero-vaginal atresia, that is, obliteration of the upper portion of the vagina and the cervix, after parturition. Occlusion of the cervix occurs, besides, after operations on the part (amputation), and in consequence of neoplasms in the cervix, which obstruct the canal (fibroid and cancerous tumors). Finally, complete closure may be the result of flexion or of cervi-

¹ *Gaz. des hôp.*, 1866, No. 71.

² *Dublin Hosp. Gaz.*, June 15, 1856.

³ *Courty Mal. de l'utérus*, etc., 2d ed., p. 397.

⁴ *L. c.*

⁵ *Diseases of Women*, 3 ed., p. 154.

cal catarrh; in the latter case it is brought about by the rupture of Nabothian follicles and the adhesion of the granulations, which are afterwards formed, to each other. These forms of atresia, which usually occur at the internal os, are so common in old women, that Hennig¹ states, that out of one hundred women, who were over fifty years of age, about twenty-eight were afflicted with atresia of the internal os.

During childhood the atresia is not attended with any noticeable consequences; Godfrey,² Breisky,³ and Gervis⁴ report exceptional cases, however, in which trouble arose, even in children, from the accumulation of mucus behind the occluding membrane.

As a rule, however, disturbing symptoms do not arise until after puberty, when the blood exuded from the uterine mucous membrane collects above the atresia and

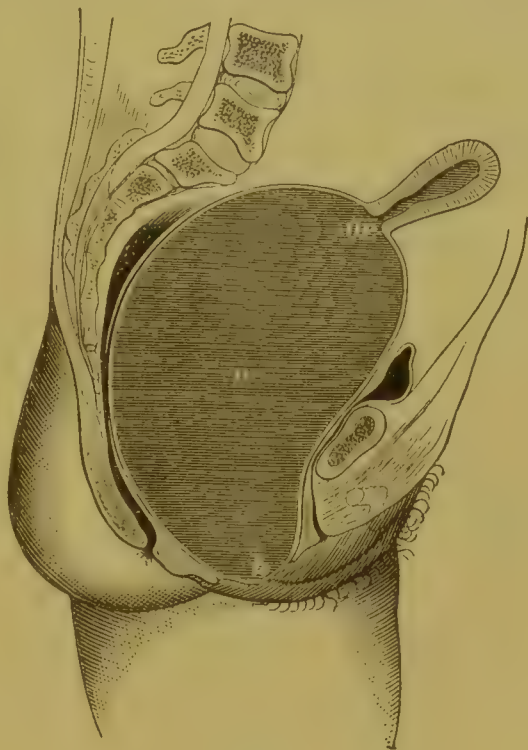


FIG. 20.

Hæmatokolpos, with atresia hymenalis.

h, the closed hymen; *v*, the vagina distended with blood; *oe*, the external os.

distends the genital canal. The nature and effects of this distention vary with the seat of the atresia.

In *closure of the hymen* (Fig. 20), or *lower portion of the vagina*, the uterus itself is but little affected. The blood collects in the vagina, and distends the latter to a greater or less extent, so that the uterus is pushed upwards, and may be felt at the summit of the enormous tumor formed by the vagina, in the shape of a small, hard body, generally a little to the right of the median line. Inasmuch as the uterus does not participate in the

¹ L. c., p. 24.

² Gaz. des hôp., No. 142, 1856, in a two months' old child.

³ Arch. f. Gyn., B. II., p. 92, note.

⁴ London Obst. Tr., Vol. V., p. 284.

distention until a very late stage, these cases should not be designated as hæmatometra, but as hæmatokolpos.

If the atresia is situated higher up in the vagina, or if the lower portion of the latter is absent (Fig. 21), the upper portion of the vagina is first distended, and then the cervix. The external os becomes distended to an enormous degree, and the



FIG. 21.

Hæmatometra, with absence of the lower portion of the vagina.

s, the deficient lower part of the vagina; *v*, distended vaginal cavity; *c*, dilated cervical cavity; *oe*, external, *oi*, internal os.

cervix and upper portion of the vagina constitute together a single large cavity. The muscular fibres of the cervix become separated in consequence of this excessive dilatation; pouches may form in the cervix, or it may even become torn. The body of the uterus is generally but little distended, or does not become dilated until considerably later.

If the external os is obliterated (Fig. 22), the whole uterus becomes distended from the start. The organ may attain a very great size; its walls are generally hypertrophic; occasionally, however (according to Scanzoni and Veit, whenever it increases in size very rapidly), they are as thin as paper. The cervix then

disappears completely, and body and cervix unite in one large cavity.

If the internal os is closed (Fig. 23), the cervix remains unchanged, and only the cavity of the body undergoes a spherical dilatation.

Of the greatest importance is *the condition of the Fallopian tubes*. The higher up the atresia is located, the easier it is for blood to collect in the tubes; such collections, however, occur also in atresia hymenalis, although much less frequently.

These hæmatoceles are not caused by the regurgitation into the tubes of the blood from the uterus, at least certainly not as

a rule (whether this occurs exceptionally is still doubtful, even after the case reported by Olshausen) ;¹ on the contrary, they are due to a hemorrhage from the tubal mucous membrane itself. This is proved by the fact that the hemorrhagic cysts are almost invariably situated nearest the abdominal extremity of the tube ; whereas the canal in the vicinity of the uterus is very narrow or entirely closed.²

It seems as though the obstruction to the menstrual flow from the uterine mucous membrane tended to provoke a vicarious menstruation from the tubal mucous membrane. The condition of the tube in such a case is exactly the same as in hydrosalpinx. The dilated canal, in consequence of the shortness of its mesentery, or, rather, mesosalpinx, is thrown into large convolutions, thus forming a number of sacs which communicate with each other by narrow openings, or are wholly independent. The ovaries may also become the seat of hæmatocele.

The blood effused into the Fallopian tubes may escape, in a natural manner, at the abdominal orifice ; generally its discharge into the abdominal cavity takes place gradually, the irritation of the foreign fluid giving rise to pseudo-membranes, which serve to agglutinate the pelvic organs and form numerous



FIG. 22.

Hæmatometra, with atresia of the external os.

oe, obliterated external os ; *c*, distended cervical cavity ; *u*, dilated cavity of the body ; *ot*, site of the internal os.

¹ Arch. f. Gyn., I., p. 53.

We cite only the cases of *Billroth* and *Steiner* (l. c.), in which the canal was very narrow, and those of *Gosselin* (Gaz. des hôp., 1867, No. 57, p. 225), *Lehmann* (Nederl. Tijdschr. voor Geneesk., 1868, I., p. 449), *Sandesson* (Schmidt's Jahrb., 1858, B. 98, p. 324), and *Routh* (Lond. Obst. Tr., Vol. XII., p. 39).

closed cavities; thus, in the event of future hemorrhage, a hæmatocele is easily formed.

The tubes may become so much dilated and attenuated by the increasing hemorrhagic exudation as to burst. Occasionally this happens spontaneously, but more frequently it occurs after the

evacuation of the hæmatometra, when the uterus and tubes are carried downwards by the contraction of the abdominal muscles, or by external pressure, in consequence of which the adhesions are lacerated.



FIG. 23.

Hydrometra, with atresia of the internal os.

The blood accumulated behind the point of occlusion has a very characteristic appearance. It has the color of chocolate or tar, is thickish, not putrid, but merely condensed; the blood-corpuscles are shrunken. The quantity of blood varies considerably, but is always less than would have been the case if the menses had continued to flow in their normal amount during the time of retention; the largest amount—three,

four, five kilogrammes—(between eight and fourteen pounds) is met with in atresia hymenalis.

After the menopause the accumulated secretion is no longer blood, but a clear or brownish serous or viscid fluid. Occasionally there is only a very small quantity of thick, tenacious, honey-like mucus; in other cases the secretion is more abundant. If the atresia is situated at the internal os, as is the rule in these cases of *hydrometra* (Fig. 23), only the cavity of the corpus uteri is dilated; the walls of the uterus rarely become hypertrophic, but are generally much attenuated; the mucous membrane resembles a serous membrane.

If the external os is obliterated, the cervix first undergoes a spherical dilatation; very rarely, and only when both orifices

are obliterated, does the uterus assume the hour-glass shape. The quantity of serous fluid is generally inconsiderable; only very exceptionally does it amount to as much as two pounds.

It is very rare for the contents to be of a different character; *pyometra* may arise if, as in the cases of Voisin, Husson, Puech¹ and Eppinger,² the uterine mucous membrane is in a condition of suppuration. If an atresia occur in a fresh puerpera, the lochia may collect in large quantity above the obstruction. Puech relates examples of this occurrence (Chambon and Guy).

Symptoms.

The atresia in itself gives rise to no symptoms, except the accumulation of the secretion above it.

In congenital atresia, therefore, there are no symptoms until after puberty; in atresia acquired after this period, there are none until ovulation next occurs. Menstrual molimina appear without any discharge of blood, last a few days, and then disappear entirely. Gradually the intensity and duration of the molimina increase; the free intervals become shorter, until finally continual colicky pains, similar to those of labor, arise, which increase considerably in violence during the period of menstruation. Disturbances of the bladder and intestine supervene, and the condition becomes exceedingly distressing. The continual pain by day and night is followed by complete loss of appetite, insomnia, and constantly increasing debility.

In hydrometra the symptoms are not equally severe, because the accumulation is more gradual and the atrophic, non-functionating uterus no longer responds with contractions to the distention of its cavity. If the contractions (which appear precisely like dysmenorrhœal symptoms—uterine colic) are wanting, the hydrometra gives rise to no trouble whatever.

Results.

If art does not interfere, the following results ensue:

In hæmatometra the blood generally either bursts through the

¹ *Puech*, 1. c., p. 28.

² *Prager Vierteljahrschrift*, 1873, 4, p. 30.

occluding membrane, or escapes into the internal organs, - a difference which renders it of great importance that the condition should be correctly diagnosticated. The former is the most favorable termination; the occluding membrane is either ruptured or is perforated by inflammation and gangrene. The former occurrence is most common in acquired, the latter in congenital atresia.

The uterus itself may also burst—most frequently at the cervix, its muscular fibres having become separated—and its contents are then poured into the abdominal cavity (in one case, see Puech, l. c., p. 58, they escaped into the adherent stomach); or the uterus may discharge its contents into the connective tissue behind the bladder. The blood then forces its way into the bladder, and the menses pass off with the urine. In the case of Graf¹ the blood worked its way downwards, and was discharged through the left nates. Very rarely, probably only when a hæmatocele has been produced by previous rupture of the uterus, does the blood burst into the rectum.

The Fallopian tube, when distended by blood, is more apt to burst than the uterus, and the accident is usually followed by fatal peritonitis. Under certain conditions, to be further explained in the chapter on hæmatocele, hemorrhage from the tube may lead to the formation of retro-uterine hæmatocele.

The symptoms may all be relieved by the menopause supervening, although this generally takes place only in acquired atresia, when it occurs at the normal climacteric period. Exceptionally the menopause may occur so prematurely in congenital atresia, as to arrest the process; under these circumstances, vicarious hemorrhage may occur from the lungs, stomach, mouth, nose, or eyes.

After the climacteric, the secretion from the uterine mucous membrane may dry up entirely, or the hæmatometra may gradually change to a hydrometra. I once observed a gradual transformation of this sort in a woman, about forty years of age, with sarcoma of the cervix, who had acquired an atresia of the uterus after a severe application of the actual cautery; afterwards,

¹ Virchow's Archiv, B. 19, p. 548.

when it became necessary from time to time to divide the atresia, the first few times blood was voided from the uterus, afterward serous fluid.

Hydrometra is much less dangerous than hæmatometra. The dilatation of the uterus is generally less considerable, and the Fallopian tubes are not apt to be involved. A rupture of the uterus and tubes is therefore a very rare occurrence. Moreover, hydrometra rarely exceeds certain dimensions. The most favorable, and not a very uncommon termination, is the rupture of the adhesions (which are often merely superficial) at the internal os and upper portion of the cervix ; but the secretion may reaccumulate and break through repeatedly. It is a rare occurrence for the secretion to decompose, with the formation of gas, and give rise to *physometra*, which betrays itself by the escape of flatus from the vagina.

Diagnosis.

The diagnosis of atresia, as long as it produces no symptoms, is never made before puberty. As a rule, however, it is easy to recognize a hæmatometra, especially as the history of the case—at least in congenital hæmatometra—points to the menstrual retention, and directs attention to this pathological condition. In those cases, also, in which the disease has been acquired, this idea naturally suggests itself, because the subjects are generally women, in whom, after certain processes (severe confinement and childbed), a premature menopause has generally occurred, though menstrual molimina still continued.

Conjoined manipulation will enable us to make the diagnosis with absolute certainty, even before the permeability of the genital canal has been tested. If the vagina is normal, the examination is made per vaginam ; if it is wanting or impassable, the examination is made by the rectum. The condition of things will vary accordingly as the vagina, cervix, uterus, or tubes are distended.

If the vagina is imperforate, the character of the large tumor in the true pelvis is evident at once, although occasionally small tumors attached to the larger body may obscure the diag-

nosis, especially as the danger of producing rupture of the distended Fallopian tubes forbids making palpation with very firm pressure. In vaginal atresia it will hardly be assuming too much to regard the smaller tumor as the uterus, even if the occlusion be situated high up in the vagina. In the latter case a circumscribed tumor, if it at all resembles the uterus in shape, is invariably formed by the body of that organ at least, though the distended cervix may be included in the bulk of the large tumor. The tubes filled with blood are softer, and situated more posteriorly, and hence are less easily felt. The possibility of a uterus bicornis must always be kept in mind, because various malformations are frequently combined in the female generative organs.

If the external os is the seat of the obstacle, the diagnosis may be attended with some difficulty. It is very important to be able to ascertain that the uterus distended with blood is spherical and very tense, almost like a full rubber ball. No other tumors possess such a characteristic consistence, with the exception of the rare malignant neoplasms of the body of the uterus.

If the external os is closed, the cervix and vaginal portion are wanting, the cervix having been wholly included in the round tumor. The tumor then could only be mistaken for a submucous fibroid, and this error can be avoided by a careful consideration of the history of the case and the symptoms, and by observing the different consistence.

If there is still any doubt, the permeability of the canal must be tested with the sound, which would naturally encounter an obstacle at the spot where the tumor begins. In atresia of the hymen and lower portion of the vagina, in which the tumor projects as a reddish or bluish mass between the labia, the matter is much simplified.

The diagnosis is most difficult in atresia of the internal os, because in this case the shortening of the cervix, which occurs besides only in submucous fibroids or polypi, is wanting. An error in the differential diagnosis between hæmatometra and pregnancy is not easily made, because the former affection is very rarely caused by an imperforate internal os. The difference in

consistence should guard us against such a mistake, for the normally growing pregnant uterus is much softer and less tense than the organ when distended with retained menstrual fluid. Fibroid tumors also do not show this firm consistence. Malignant growths, however, may be equally tense, and moreover, since they sometimes present an impediment to the introduction of the sound, they may render the differential diagnosis peculiarly difficult.

A hydrometra is much more rarely met with, and may seriously interfere with the diagnosis, because the history, in women beyond the climacteric, does not afford much information, and also because the tumor does not attain any considerable size. Conjoined manipulation, executed with care, will detect the enlarged uterus which differs from chronic metritis in its spherical shape, and in the presence of an impediment to the passage of the sound. Interstitial and submucous fibroids, as well as carcinoma and sarcoma, may, however, occasionally give rise to mistakes.

A somewhat unimportant diagnostic error may occur with reference to the character of the retained fluid. Direct signs, such as the reddish shade, caused by the blood shining through a thin hymen, are but seldom present. The question whether the tumor contains blood or serum, must generally be decided by the age of the patient, and in this way we may occasionally be in error.

We have referred above to those cases in which there were several occluding membranes, and in which first only mucus escaped, the discharge of blood not taking place until after the second barrier had been divided. Bryck,¹ however, found mucus instead of blood in the case of a girl eighteen years old, and Veit² in one twenty-three years of age. Instances in which the contents of the tumor are sanguineous after the climacteric period are rather more common. Puech³ reports a case of his own, and one each by Bérard and Thompson. Eggel⁴ opened a hæmatometra in a woman sixty-six years of age. We may conclude from the interesting observation reported by Pistor⁵—who found sanguineous contents in the tumor in a woman sixty-eight years of age, at whose autopsy uterine fibroids were discovered—

¹ Wien. med. W., 1865, No. 11.

² See Straeter, l. c., p. 26.

³ L. c., p. 26.

⁴ Berl. Beiträge zu G. u. G., 1, p. 108.

⁵ Berl. kl. W., 1870, No. 17, and 1872, No. 36.

that a hæmatometra in old women may occasionally be accounted for by the presence of neoplasms, which induce hemorrhages into the cavity of the uterus.

Prognosis.

It is evident from the way in which hæmatometra terminates, and from the preponderance of the unfavorable results, that the affection, if left to itself, is of an exceedingly serious nature.

But the operation is not without danger. Experience teaches that especially in uterine atresia, with dilatation of the tubes, rupture of the latter is of so frequent occurrence immediately following the operation, that French operators (Boyer, Dupuytren, and Cazeaux, for instance) have declared themselves opposed to operative interference, and pronounce the patient lost under any circumstances.

Rupture of the tubes after the operation is probably partly due to the uterine contractions which expel the retained blood from the uterus, in which contractions the tubes participate, but is owing mainly to the adhesions which are formed between the dilated tubes and the adjacent organs. The rationale of this accident is, that the tubes, which are firmly fixed above, are no longer pushed upwards by the tumor, after the evacuation of the vagina and uterus, but are pressed downwards by the abdominal muscles, in consequence of which they are torn. (In a case reported by Gosselin, *Gaz. des Hôpitaux*, 1867, No. 57, the autopsy revealed the fact that the adhesions of the distended tube with the omentum had caused the rupture.) The laceration has doubtless been often caused also by the efforts of the operator to squeeze out the contents of the hæmatometra after it has been opened.

As a rule, tubal hæmatocele is more common, and of larger dimensions when the atresia is situated high up; consequently old uterine atresia is the most dangerous, while in obliteration of the hymen, or of the lower portion of the vagina, the danger is comparatively slight, although not entirely absent.

A successful operation is followed by complete recovery, provided the incision is prevented from closing; indeed, a number of instances have been recorded where conception afterwards took place.

Treatment.

The only successful treatment consists in laying the tumor open by an operation, the time for which is chosen between two menstrual periods.

In atresia hymenalis and inferior vaginal atresia the operation is very simple. A crucial incision is made in the protruding membrane, or, what is preferable, it is seized with a tenaculum, and a circular piece excised.¹

If a simple, thin, transverse membrane obstructs the vagina higher up, it is merely incised sufficiently to permit the escape of the blood.

Those cases in which the vagina is either partly or entirely wanting are much more serious. In order to avoid injuring the bladder or rectum during the operation of constructing a new vagina, it is advisable to operate at one sitting in the manner proposed by Amussat,² that is, to slowly tear open a passage with the fingers, and by means of blunt instruments. This is done as follows: A catheter is passed into the bladder and given to an assistant to hold, and the operator introduces the index finger of the left hand into the rectum; a transverse incision is then made between the anus and the urethra, which in these cases lie very near each other. After dividing the integument, the operator slowly ascends between bladder and rectum, using only the finger and handle of the knife until he reaches the tumor, which is most conveniently opened by means of a curved trocar. After this instrument has been passed into the retained blood, a director is introduced through the canula, the latter is withdrawn, and the opening is then enlarged with the knife or Simpson's metrotome. In order to keep the passage free, laminaria bougies are introduced, and digital examination is frequently practised. Heppner³ makes an H-shaped incision, and by this means, together with the extension of the vertical incision posteriorly, skin-flaps are formed, which he sews into the newly formed vagina.

¹ *Baker Brown*, Surg. Diseases of Women, 3d ed., p. 272, and *Veit*.

² *Observ. sur une opér. de vagin artificiel*, 1835.

³ *Petersb. med. Zeitschr.*, 1872, 6 H., p. 552.

If the cervix is imperforate, it is best to use the trocar at once, as already described. If there is any indication as to the situation of the vaginal portion, the instrument should of course be introduced at this point, otherwise, quite far backwards; for experience has shown that the trocar is most liable to be passed through the anterior wall of the uterus.

The puncture of the tumor through the rectum, as recommended by Baker Brown,¹ is to be avoided if possible. It may become necessary, however, in case of absence of the vagina, where it is impracticable to reach the tumor in the ordinary way.

The tumor having been opened, it is of the utmost importance that the blood be evacuated slowly, lest rupture of the tube occur in consequence of the above-mentioned cause. Above all, pressure on the abdominal walls is to be strictly avoided; no injections are to be made, but, after the incision of the tumor, whatever fluid escapes of itself may be allowed to do so. The patient should then be lifted into bed with the utmost care, and the abdominal muscles kept perfectly quiet. Cautious injections should be made in the event of decomposition of the fluid which is still retained.

The first menstrual period after the operation is still attended with some danger.

Hydrometra should likewise be punctured with a trocar. In many cases, where adhesion has taken place from the growing together of opposite granulating surfaces, the sound suffices.

UNILATERAL HÆMATOMETRA, WITH DUPLICATION OF THE GENITAL CANAL.

Rokitansky, Zeitschr. d. Ges. d. Wiener Aerzte, 1859, No. 33, and 1860. No. 31.—*Simon*, M. f. Geb., B. 24, p. 292.—*Holst*, Beitr. z. Gyn. u. Geb., H. 1. p. 63.—*Schroeder*, Krit. Unters. über die Diagn. d. Hæmat. retrout, etc. Bonn, 1866, and Berl. klin. Woch., 1866, No. 38.—*Neugebauer*, Arch. f. Gyn., II., p. 246.—*Freund*, Berl. B. z. Geb. u. Gyn., II., p. 26.—*Hegar*, Berl. B. z. Geb. u. Gyn., III., p. 141.

Etiology.

Unilateral hæmatometra is always congenital, and depends on

¹ Surg. Diseases of Women, 3d ed., p. 284.

the occlusion of one of the passages of a double genital canal. In the not uncommon complete, or in the partial duplication (see p. 38), both portions may be imperforate, and thus a double hæmatometra is formed (see Santesson, Preussische Vereinszeitung, 1857, No. 50; Holst, l. c., p. 90, and Nélaton, Gaz. d. hôp., 1856, No. 88, p. 350, in which last case perhaps only one-half menstruated). It is much more frequent, however, to find only one-half closed. These cases are particularly interesting, because, as a rule, while one side menstruates regularly, a hæmatometra develops on the other. The considerable number of cases reported during the past few years, prove that this affection is not an extremely rare one.

We find altogether 38 cases on record belonging to this category, of which 29 came under clinical observation, namely, of

Uterine atresia, 11, as follows: (1.) Leroy, Journal des conaiss. méd.-chir., 1835, T. II., p. 181. (2.) Rokitsansky, l. c., 1860, No. 31. (3.) Thüngel, Klin. Mittheil., 1860, p. 55. (4.) Holst, l. c., p. 63. (5.) Jones, Brit. Med. J., July 22, 1865, p. 54; see M. f. Geb., B. 30, p. 180. (6.) Olshausen, Arch. f. Gyn., B. I., p. 41. (7.) Breslau, Schweiz. Z. f. Heilk., 2 Heft, 1863, p. 310, 4th case. (8.) Credé, M. f. Geb., B. 9, p. 457, 6th case. (9.) Jacquet, Berl. klin. W., 1874, No. 9. (10 and 11.) Hegar, l. c. (two cases in a rudimentary horn).

Superior or middle vaginal atresia, the following 12: (12.) Veit, Frauenkrankh., 2 Aufl., p. 537. (13.) Décès, Bull. de la Soc. anat., Juillet, 1854. (14.) Passauer, Berl. klin. W., 1867, No. 26. (15 and 16.) Neugebauer, l. c., p. 247 and p. 255. (17 and 18.) Breisky, Arch. f. Gyn., B. II., p. 84 and p. 451. (19.) Breslau, l. c., p. 303, 2d case. (20 and 21.) Freund, l. c., cases 1 and 2. (22.) Braus-Spiegelberg, Berl. klin. Woch., 1874, Nos. 10 and 11. (23.) Breisky, Arch. f. Gyn., B. VI., p. 89 (Hydrometra).

Inferior vaginal atresia, the following 5 cases: (24.) Beronius, Preuss. medic. Zeit., 1862, No. 33, p. 259. (25.) Schroeder, l. c., p. 3. (26.) Hegar, M. f. Geb., B. 17, p. 418. (27.) Hertzfelder, Oesterr. Zeitschr. f. prakt. Heilk., 26 Dec., 1856. (28.) Braun, Wiener med. Woch., 1861, p. 457, 6th case.

Atresia hymenalis, 1 case: (29.) Simon, l. c., p. 292.

Besides these, the following five cases were observed in the dead subject; three being of uterine atresia, viz.: (30.) Rokitsansky, l. c., 1859, No. 33, first case. (31.) Churchill, Lancet, 11th Nov., 1865, p. 536. (32.) Hofmann, three cases of uterine malformation. Erlangen, 1869, Diss. inaug., p. 16; and two of vaginal atresia, viz.: (33.) Rokitsansky, e. l., second case. (34.) Wrany, Prager Viertelj., 1868, 3, p. 39.

To these are to be added five cases occurring in children, viz.: (35.) Otto, see Kussmaul, Von dem Mangel, etc., p. 136 (uterine atresia, with atresia of the vagina, which was single). (36.) Case in the Maternité, Gaz. d. hôp., 132, Nov. 13th, 1866.

(37.) Puech, *Gaz. des hôp.*, 1857, p. 586. (38.) Breisky-Klebs, *Arch. f. Gyn.*, B. II., p. 92, note, the three last cases of vaginal atresia.

Pathological Anatomy.

There are several varieties of this malformation :

(1.) Both canals of Müller forming the double uterus may be completely developed, but the hymen of one side is imperforate.

(2.) Both canals are fully developed, but one has not opened into the urogenital sinus, and the vagina of that side is, therefore, closed immediately behind the vulva.

(3.) The development of one of Müller's canals has been arrested, its lower portion is wanting, and the vagina of that side, therefore, terminates in a blind pouch, either in the middle or higher up.

(4.) The vagina is single, either because one of the canals of Müller is imperforate to that extent, or because the two vaginal halves have become united. The uterus, however, is double, and one horn is closed.

(5.) We may have a uterus unicornis with the opposite horn rudimentary ; the latter is hollow, but without any external opening (Hegar).

Besides these varieties other complications may occur. Otto found in a new-born infant closure of one uterine horn, and of the vagina, which was single. In all these instances the uterus may be either septus or bicornis, but is generally the latter.

The consequences of the unilateral atresia (see Fig. 24) are identical with those described above under hæmatometra.

From the period of puberty, the menstrual fluid accumulates above the point of occlusion, and distends the genital canal ; at first the vagina alone is involved in all cases where the occlusion is situated low down. Hæmatocele of the Fallopian tube may also occur, and entail the same dangers as were mentioned above.

In amenorrhœa mucus and pus may collect, as was the case with a patient under the care of Breisky ; in the other case reported by Breisky, and in that observed by Braus, after the hæmatometra had been operated upon, pus collected in the half which had been obliterated. The last case reported by Breisky,

in which a very large hydrometra had formed on the imperforate side in a woman thirty-eight years of age, who had borne four children, is unique.

Symptoms.

The most prominent symptoms are periodical attacks of pain, quite similar to those met with in simple hæmatometra, but characterized by an accompanying discharge of menstrual fluid. The disturbances frequently, but not invariably, begin with menstruation; occasionally they are deferred to a much later period. At the beginning, the symptoms of the disorder are apparent only during the menstrual epoch; later, however, the painful contractions are constant. It is important to be aware that the pain is not in all cases confined to the menstrual period, but that it may occasionally come on very suddenly. This may perhaps be accounted for by the supposition, that the two halves menstruate at different periods. The occasional appearance of the symptoms later may be explained by supposing that for some time the obliterated horn did not menstruate at all, or but very slightly, and that the menstrual secretion only began or became increased in quantity after some particular event (sexual excitement, puerperal state).

The tumor, consisting of the retained blood, makes its appearance most rapidly in deep occlusion of the vagina, in which case it soon protrudes between the labia. In the abdomen it is not discovered till later. The influence on the bladder and rectum is the same as that of simple hæmatometra.

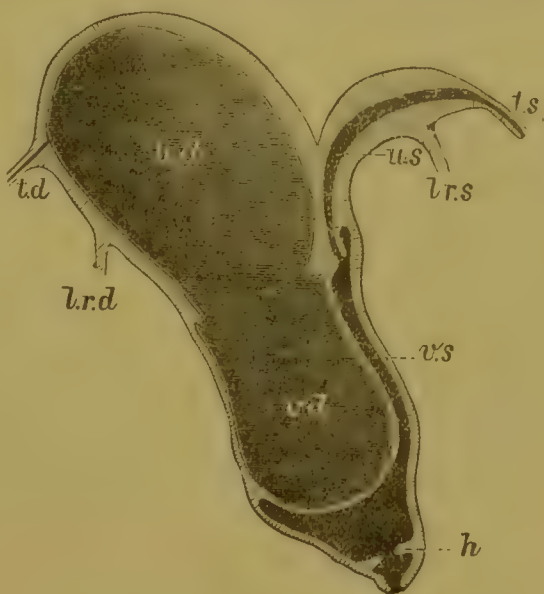


FIG. 24.

Unilateral hæmatometra, diagrammatic. after Freund.

h, hymen; *vs*, left open vagina; *us*, left uterus; *la*, left tube; *lrs*, left round ligament; *vd*, *ud*, closed uterus and vagina on the right side, dilated by an accumulation of menstrual blood; *ld*, right tube; *lrd*, right round ligament.

The character of the menstruation varies. Usually it is normal, but it may be absent for a greater or less time, or change to menorrhagia.

The general health does not become affected in unilateral hæmatometra until a late period.

The open horn may, of course, become pregnant, although at an advanced stage the diminution in space caused by the increasing tumor will materially interfere with conception.

Terminations.

These are substantially the same as in simple hæmatometra. External evacuation of the fluid is the most common termination, and is particularly apt to occur, because the tumor projects into the open genital canal, and often is separated from it only by a very thin septum. The rupture generally occurs in the septum, between the two uterine segments; more rarely in the vaginal partition. Even after a termination so favorable as this, purulent inflammation and death may ensue.

Another favorable termination, and the one which we should most naturally expect in this variety of hæmatometra, is the suppression of menstruation on the imperforate side, and the discharge of its functions by the other horn of the uterus. But it can scarcely be determined how common this fortunate issue is, since instances of it are very apt to escape medical observation. This was doubtless the case in the specimen in the Pathologico-Anatomical Museum of Erlangen, described by Hofmann, which belonged to a woman, sixty-four years of age, of whose history nothing was known, except that she had never borne children. The right imperforate cornu contained a cavity of only moderate size, which was partly filled by nodular protuberances of the mucous membrane of hemorrhagic origin.

The unfavorable terminations do not differ from those of simple hæmatometra.

Diagnosis.

The diagnosis is least difficult in cases of complete duplication, and is usually made with ease if the possibility of this

malformation is only borne in mind. Throughout the whole length of the vagina, from above downwards, a lateral tumor may be felt, which does not always lie exactly parallel to the permeable vaginal canal, but for embryological reasons usually winds somewhat spirally around the open vagina, the lower portion being situated somewhat anteriorly to, the upper somewhat behind, the vagina, or the reverse. The tumor is approximately cylindrical in shape, tense and fluctuating, and its continuation upwards is attached laterally to the permeable uterine horn.

A tumor exhibiting these marks, and filled with fluid, cannot be anything else, and the puncture, which reveals the characteristic blood of hæmatometra, is hardly needed to confirm the diagnosis.

A cystocele is distinguished from the conditions, for which it might possibly be mistaken, by means of the catheter; vaginal cysts do not grow to such a size, and are not attached to the vagina longitudinally; an enterocele does not fluctuate nor form an abdominal tumor; thrombi (hemorrhagic effusions in the cellular tissues about the vagina) are always connected with labor, and the puerperal state; hæmatoceles are not found in this form, and perivaginal abscesses do not extend up so high.

A cyst of the Bartholinian gland may possibly be mistaken for it in very exceptional cases where it extends equally high up, as proved by an observation by Höning.¹ The extension of the cyst into one of the labia majora, which is not possible in hæmatometra, must here also be relied upon as a sure mark of distinction.

The diagnosis is much more difficult in those cases where the vagina is single and the blood is retained only in one uterine horn.

A firmly elastic tumor, which presses the vaginal vault downwards, is then felt closely adhering to the uterus. This fluctuating, sharply defined tumor, which is so closely attached to the uterus, or, where the uterus is distinctly double-horned, diverges above to the opposite side, is, after all, scarcely to be mistaken for any other neoplasm. The diagnosis is greatly strengthened by the fixed position of the intravaginal portion of the cervix,

¹ M. f. G. B., 34, p. 130

that is, by the fact, that on the side of the tumor the vaginal cul-de-sac is completely wanting; in case of considerable distention of the closed horn the external os assumes a horse-shoe shape, with the open side turned toward the tumor.

The diagnosis of a hæmatometra in a rudimentary horn is attended with the most difficulty. Hegar, however, succeeded in the two cases observed by him in making the diagnosis by exclusion. The connection of the tumor with the uterus by means of a cord, which is attached to the upper part of the disproportionately large cervix, and the presence of a uterus unicornis are the main points to be observed. The differential diagnosis from a fibroid attached by a pedicle to the broad ligament is especially difficult. In case of need, the diagnosis may be settled by puncture of the tumor, which should be made through the vagina or the abdominal walls, according to the situation of the growth.

Prognosis.

As already stated above, the danger is not so great as in simple hæmatometra, because, irrespective of the occasional spontaneous cessation of the sanguineous exudation in the imperforate horn, the rupture externally, namely, into the open genital canal, is much more common, and occurs much more readily.

Treatment.

The operation is performed in the same manner as in simple hæmatometra, by incising the lowest point of the protruding tumor.

If the vagina is double, a crucial incision is made in the tumor, or a piece of its wall is excised, care being taken, however—in order to prevent impregnation of that side—not to make the opening too large, lest by accident the penis should get into the previously imperforate half.

In uterine atresia, the operation is best performed with a trocar, which is thrust into the protruding tumor, close to the external os.

Very serious difficulties are present when the blood is con-

tained in the cavity of a pedunculate rudimentary horn. The operation is inevitable in these cases also, if the distress increases. An effort must be made to reach the tumor with the trocar from the vagina; only in case of extreme necessity should it be done from the abdominal surface. Hegar attempted to induce adhesion of the tumor by previous cauterization of the vaginal vault.

STENOSIS OF THE UTERUS.

Mackintosh, Pract. of Physic, 4 ed., T. II. London, 1836, p. 481.—*Simpson*, Sel. Obst. Works. London, 1871, p. 677.—*Barnes*, London Obst. Tr., Vol. VII., p. 120.—*Sims*, Clin. Notes on Uterine Surgery. New York, 1871, p. 177.—*Greenhalgh*, London Obst. Tr., VIII., p. 142.—*Tilt*, c. l., p. 262.—*Beigel*, Berl. klin. Woch., 1867, p. 493, and *Graily Hewitt's* Diseases of Women. Phila., 1868, p. 693.—*Smith*, Obst. Jour. of Great Britain, Feb., 1874, p. 705.

Etiology and Pathological Anatomy.

Stenosis of the cervix may be congenital or acquired; if *congenital*, generally the whole cervix is involved; the external os is usually the seat of the chief constriction, rarely the internal os. In the normal uterus (we do not refer here to the small cervix and external orifice of the undeveloped uterus), the intravaginal portion of the cervix is occasionally very long, hard, and cartilaginous, and projects as an uncommonly sharp conoidal mass into the vagina. On the tip of this mass is the external os, a very small, at times barely perceptible opening (Fig. 25), which is scarcely visible, even through the speculum (and then sometimes only when a small drop of mucus protrudes from it). Not unfrequently the anterior lip projects beyond, and slightly overlaps the posterior, closing the os as if with a valve.



FIG. 25.
Congenital stenosis of the cervix.

In rare instances the whole vaginal portion is swollen and œdematous.

Acquired stenosis is induced by various circumstances, particularly by injuries during delivery and by puerperal inflammatory processes. It is, however, by no means rare in persons who have never borne children, even if we omit those varieties of constriction at the internal os resulting from flexion and fibroid tumors, which do not belong in this category. Stenosis may occur as the result of an inflammatory blocking up of the canal; or it may occur when there is inflammation of the mucous membrane, by the bursting of the distended cervical follicles (ovula Nabothi) and adhesion of their granulating surfaces; or finally, by means of cicatricial contractions of all kinds, of which we will only mention those produced by cauterization.

Symptoms.

Two symptoms accompany obstruction of the cervical canal, of which the most important, pathologically speaking, is *dysmenorrhœa*. This symptom is characterized, as usual, by the occurrence of more or less severe uterine colic at the menstrual period, and this colic may occasionally increase to the most violent paroxysms of pain. Although it is a general rule to find the pain corresponding in severity to the greater or less amount of cervical obstruction, this is by no means always the case. The rapidity of the hemorrhagic exudation from the uterine mucous membrane doubtless greatly influences the severity of the dysmenorrhœa. A gradual hemorrhage into the uterine cavity will naturally permit the blood to be discharged with sufficient rapidity, even through a very narrow cervical passage, without producing uterine colic. A sudden and profuse menstrual flow, on the other hand, will at times find some difficulty in passing through even a moderately narrow cervical canal, and as a consequence the cavity of the uterus will be forcibly distended, and possibly very severe dysmenorrhœa be produced. In this way we must seek to explain the circumstance, that in some cases of very narrow cervix, the act of menstruation is entirely painless, while in others, with but slight obstruction, the distress is very great.

An additional consequence of the habitual irritation, to

which the uterus is subjected in aggravated dysmenorrhœa, may appear in the shape of metritis and perimetritis, and their symptoms complicate those of simple stenosis.

The second result of the stenosis is sterility. In this connection we particularly desire to point out the fact that, clinically speaking, sterility does not, except in very rare cases, denote the absolute impossibility of conception, but generally only the presence of a greater or less obstacle. It is exceedingly plausible to assume that the possibility of a meeting between the semen and the ovum is prevented in exact proportion to the degree of constriction existing in the cervical canal and at its external orifice, even though the mechanism, by means of which the spermatozoa penetrate into the inner genital canal, be left out of consideration.

The nature of this mechanism has not yet been elucidated. Formerly the opinion was generally held, that during coition the orifice of the male urethra touched the external os, and that at the ejaculation the semen was injected directly into the uterus. Aside from the fact, that the force of ejaculation certainly does not suffice to separate the contiguous walls of the uterus and propel the semen between them, we cannot for a moment entertain the idea that the two orifices lie in actual contact, and thus form a continuous canal between the male urethra and the cavity of the cervix. A piston-like movement of the penis, by which the latter, while being thrust into the vagina, pushes the ejaculated semen contained in the upper portion of that canal into the uterus, cannot be assumed, because the semen has sufficient room to escape at the side of the penis and into the vaginal cul-de-sac.

The ciliary action of the epithelium has nothing to do with the propulsion of the semen, because the spermatozoa travel through the whole Fallopian tube to the ovary, and the cilia of the tubal epithelium vibrate in the opposite direction. The great length of this journey, made by the spermatozoa from the uterus to the peritoneal termination of the tube,—a journey, therefore, of such length that we cannot reasonably suppose it to have been made under the influence of only a single force,—favors the assumption, that the inherent power of locomotion of the spermatozoa themselves is the most important and indeed the decisive factor in their progress. That their locomotor powers are by no means slight, has been proved by Lott,¹ by direct observation; he saw them traverse the space of about one centimetre in one hour.

We do not doubt that the existence of such a power of locomotion in the spermatozoa is a sufficient explanation; for in the pool of semen deposited in the vaginal cul-de-sac, into which the intravaginal portion of the cervix dips, there is con-

¹ *Der Cervix Uteri, etc.*, p. 142.

tained an enormous quantity of spermatozoa, of which it is necessary that only a very small number should find their way up the cervical canal.

Another force still seems to be active in securing the entrance of the spermatozoa *en masse* into the cervical canal, namely, a species of suction-power of the uterus. During cohabitation the plug of mucus which ordinarily occupies the cervical canal appears to be expelled into the vagina, and hangs down in the shape of a stringy mass, referred to by Kristeller.¹ Of necessity, as soon as the expelling force ceases, an equal amount of mucus must be drawn up into the cervix, and as in the meantime the semen and cervical mucus have become intimately commingled in the vagina, it stands to reason that with this alkaline mucus, which preserves the activity of the spermatozoa—whereas the vaginal secretion is poisonous to them—a number of lively spermatozoa must be sucked into the cervix. The force expelling the cervical mucus is supposed by Sims² to be the contraction of the upper portion of the vaginal wall, which presses the glans penis against the cervix; Kehrer,³ however, endeavors to account for the expulsion by the active contraction of the cervix itself. Other observers, particularly Wernich⁴ and Fehling,⁵ believe that the mucous plug is expelled by an “erection” of the cervix, at the relaxation of which the mucus, commingled with semen, returns to the cervical cavity.

A very narrow external os would impede conception, not so much by the mere presence of a constriction, as by greatly interfering with, if not entirely preventing, the process of expulsion and subsequent suction.

Diagnosis.

In the congenital form, our attention is at once attracted, in a digital examination, to the sharply conical shape of the intravaginal portion of the cervix, and to the exceeding smallness of the external os. The condition of the cervix farther up must be ascertained by the use of the sound. The external os may be so small as to require the substitution of a slender surgical probe for the uterine sound; when the obstruction is due to tumefaction, however, a sound of not too slender proportions will be found more serviceable.

Acquired stenosis is likewise detected by the sound.

¹ Berl. klin. Wochenschr., 1871, Nos. 26-28.

² Loc. cit., p. 363.

³ Zusammenh. des weibl. Genitalkanals. Giessen, 1863, p. 41.

⁴ Berl. Beitr. z. G. u. Gyn., B. 1, p. 296, and Berl. klin. W., 1873, No. 9.

⁵ Arch. f. G. B., V., p. 342.

Prognosis.

Life is rarely endangered by cervical obstruction, although the resulting dysmenorrhœa is a serious obstacle to the enjoyment of life's pleasures, and also may entail vitally dangerous diseases in the shape of metritis and perimetritis. By means of operative interference, not dangerous in itself, the prognosis at once becomes favorable, the dysmenorrhœa usually speedily disappears with the dilatation of the cervix, and frequently conception soon ensues.

Treatment.

The only rational therapeutical indication is the dilatation of the constricted cervical canal. This dilatation may be accomplished in various ways, viz. :

1. By the introduction of bougies gradually increasing in size, by means of other mechanical dilators, or by means of substances which swell by imbibition (laminaria and sponge-tents). The advantages and evils of these methods have already been discussed. As a rule simple dilatation is fully as dangerous as the cutting method, besides being less effective. The ease with which the cervical canal contracts again to its original size, after mechanical dilatation, is shown in a case reported by Barnes, in which, notwithstanding the constriction, conception took place; but the stenosis returned after miscarriage in the fifth month, that is, after an extreme degree of mechanical dilatation. This opinion regarding the transitory nature of the result will probably also be found to apply to the new dilator recommended by Ellinger.¹

2. Dilatation of the constricted cervical passage may also be achieved by operative means.² For this purpose a variety of specially constructed instruments have been devised, some with one, others with two blades. To the former class belongs the

¹ Arch. f. Gyn. B. V., p. 268.

² *Oppel*, Wiener med. Presse, 1868, Nos. 34-36; *G. Braun*, Wiener med. W., 1869, Nos. 40-44; *Henry Bennet*, Brit. Med. J., Sept. 21, 1872; *Olshausen*, Die blutige Erweiterung des Gebärmutterhalses, No. 67, der Samml. klin. Vorträge.

instrument described by Simpson (Fig. 26), which is simple in construction and thoroughly useful. The blade is kept concealed during the introduction of the instrument, and is made to protrude upon its withdrawal; in this way first one side of the cervix and then the other can be divided. In order to avoid this repeated introduction, similar instruments, provided with two blades, which are arranged to emerge on either side by pressure, have been constructed by Greenhalgh and Martin. In the hysterotome of Mathieu the two blades are made to protrude by merely withdrawing the instrument. A very simple two-bladed metrotome has been devised by Coghill¹ (Fig. 27).

The instruments with only one blade have the disadvantage of making the first incision deeper than the second, because when the latter is made there is much less resistance at the back of the knife. With the two-bladed contrivances this is avoided; but even they are liable to cut unequally, because the tissues may be of different density on either side, and one knife may cut better than the other.

The dilatation of the external os is apt to be rather slight with these instruments, and it is generally found necessary, in addition, to incise the cervix with the scissors.

For this reason a more simple, and at least equally effective, plan is to discard all complicated instruments and operate only with the knife and scissors.

After bringing the cervix into view in the speculum, and securing it with a tenaculum, the slender blade of a long pair of scissors, the handles of which are bent downwards (see Fig. 28) in order not to interfere with the view through the speculum, is passed into the cervix, and one side of the latter cut through to the vaginal insertion; the scissors are then withdrawn and reintroduced, and the other side divided in the same manner.

If the constriction extends to the internal os, the latter must then also be divided laterally, either with Simpson's metrotome, or with the small knives devised by Sims and others.

Inflammation of the uterus and cellular tissue does not ensue

¹ Edinb. Obstet. Tr., II., p. 340.

if the operation has been performed with clean instruments; the hemorrhage, however, may be considerable, and occasionally serious. For this reason, and also to prevent the rapid union of the divided parts, it is advisable to cauterize the raw surface, either by touching it with a pointed actual cautery iron, or by inserting small pledgets of cotton, impregnated with chloride



FIG. 26.
Simpson's metrotome.



FIG. 27.
Coghill's metrotome.



FIG. 28.
Scissors for the division of the
cervix through the speculum.

of iron, between the edges. A large tampon should then be placed in the vagina to keep these pledgets in place.

Other treatment than absolute rest for a few days is not required. On the following day the tampons should be removed, and precautions taken to prevent reunion, to which the cervix is very much disposed. The external os is best kept open by the finger, which is thrust into it daily, or every other day; the internal os, by the repeated introduction of thick bougies.

If the vaginal portion of the cervix is conically elongated and the external os very small, it is advisable to remove a portion of it with the knife and scissors, or, after Spiegelberg's plan,¹ with the galvano-cautery.

HYPERTROPHY OF THE UTERUS.

General Hypertrophy.

Klob, *Pathol. Anat. der weibl. Sexualorg.*, pp. 124 and 203.—*Säxinger*, *Prager Vierteljahrsschrift*, 1866, 1, p. 114.—*Courty*, *Traité des mal. de l'utérus*, etc., 2 éd. Paris, 1872, p. 702.

Etiology.

True hypertrophy and hyperplasia of the uterus, *i.e.*, an equable increase in size and number of all its constituent parts, particularly of its muscular fibres and connective tissue, is a very rare pathological condition. The physiological counterpart of this state is pregnancy; a general pathological hypertrophy of this kind is found most clearly developed in the case of abnormal contents in the cavity of the uterus, particularly in hæmato-metra.

Hyperplasia of the connective tissue alone is much more frequent. As a pure anomaly of nutrition, independent of inflammation, it is very rare; but it is quite common as a consequence of subacute or chronic inflammatory processes, or, at least, as a secondary process, complicated with inflammation, as in defective puerperal involution. A well-defined line can scarcely be drawn between simple hypertrophy and that form which is accompanied by inflammatory manifestations, at least such as are clinically demonstrable. Klob almost completely omits chronic metritis; our own conviction, which we shall hereafter find occasion to explain more particularly, is that, for clinical reasons, we are, for the present at least, unable to spare the general pathological condition known as chronic metritis, even though morbid changes, which are from an etiological stand-point totally different, be included under the term, and though all these

¹ *Archiv f. G.*, 5, p. 436.

changes may not be due to inflammation. We shall, therefore, describe the great majority of cases of general increase in bulk of the uterus under the head of chronic metritis, and only consider here as instances of pure hypertrophy, without inflammatory origin, those cases in which an increased supply of blood has induced a corresponding increase in the nutrition of the uterus, without the occurrence of any primary or occasional subsequent inflammatory action.

The most common example of this variety is the connective-tissue hyperplasia in tumors of the uterus, especially in interstitial fibroids. So much irritation is excited and maintained by these growths that, without the occurrence of the least inflammatory action, the supply of nutritive material becomes more abundant than normal, and either a true hyperplasia, or, as a rule, a diffuse proliferation of connective tissue takes place throughout the whole uterus.

That form of hypertrophy which, according to Seyfert,¹ is occasionally met with in prostitutes, may be explained in the same manner; the hypertrophic condition, however, which is not unfrequently seen in married women, whose generative organs are irritated by frequent but imperfect sexual intercourse, and which West² classifies under the head of simple hypertrophy, should in all probability be generally designated as chronic metritis.

Cases of hypertrophy from displacement, especially prolapsus and flexions, only very exceptionally come under this category. The hypertrophy is caused by passive congestion; the displacement acting as an obstruction to the free return of blood from the uterus. The usual occurrence of inflammatory action in the course of the affection places this variety under the head of chronic metritis. The congestion is less likely to increase to inflammation in those cases of venous stasis dependent on disturbance of the general circulation, in consequence of cardiac or hepatic disease.

The arrest of puerperal involution also, clinically speaking,

¹ *Saxinger*, l. c., p. 115.

² *Lehrb. der Frauenkrankh.* III. Aufl., p. 111.

rarely belongs here. It is very rare to find such uteri merely enlarged without a trace of inflammation. As a rule, the uterus is found to be sensitive, or, at least, from time to time, an increase in bulk, accompanied by pain, takes place. We therefore include this form also under the clinical condition of chronic metritis.

Pathological Anatomy.

The uterus in true hypertrophy does not differ microscopically from that enlarged by connective-tissue proliferation. The microscope alone decides whether all the constituent parts are increased in nearly the same proportion, or whether the connective tissue is particularly abundant.

The uterus is especially enlarged, as a rule, in the antero-posterior diameter, whereby it acquires a somewhat spherical shape. Its walls—particularly at the fundus and posterior surface—are considerably thickened. Its tissue is generally not very hard, but rather soft and succulent; not until the condition which causes the hyperplasia ceases, and the proliferation no longer continues, do the fresh connective-tissue elements undergo the change into fibres, which process is followed by cicatricial retraction, and consequent induration.

Symptoms.

Since a simple increase in volume of the uterus, without any complications whatever, is exceedingly rare, the description of the symptoms is necessarily drawn rather from analogical deductions than from personal observation. The uterus, increased in weight, changes its shape and position somewhat, the swelling of the antero-posterior diameter removes the concavity on the anterior surface, and the heavy fundus falls more forward, forming a stronger anteversion than is natural. Should the uterus, however, be disposed to a posterior displacement, retroversion of a high degree will occur. The consequences of these changes are sacral pain, a sensation of weight and downward pressure in the hypogastrium, and disturbed micturition; hysterical symptoms of various kinds may also make their appearance. In hyper-

trophy accompanying other diseases (fibroids, prolapse), these hysterical symptoms predominate.

Diagnosis.

The general enlargement of the uterus is detected by means of conjoined manipulation. If its walls are of uniform thickness, if the organ is entirely devoid of sensitiveness, and no inflammatory action has ever been present, the diagnosis is that of simple hypertrophy.

Treatment.

During the first stage of uniform hypertrophy, even in the absence of all inflammation, slight but frequently repeated abstractions of blood are most effective, both in active and passive hyperæmia. If the hypertrophy is attributable to other disorders, these latter are to be treated. Very old cases are but little influenced by treatment; even that favorite remedy, the iodide of potassium, will scarcely be of service.

HYPERTROPHY OF THE CERVIX.

Levet, Jour. de méd., T. 40, 1773, p. 352.—*Heming*, Lancet, Aug., 1844.—*Kennedy*, Dublin Monthly Journal, Nov., 1838, Vol. XIV., p. 319 (see *Forriep's* Notizen, 1839, B. IX., No. 193, p. 266).—*Huguier*, Mémoires de l'acad. de médecine. Paris, 1859, T. 23, p. 279, and Sur les allongements hypertroph. du col de l'utérus. Paris, 1860.—*Stoltz*, Journal hebdomadaire, Juin, 1859.—*Scanzoni*, Chronische Metritis, pp. 46 and 58.—*Rumbach*, Des allong. hypertr. du col de l'utérus. Thèse. Strasburg, 1865, p. 5.—*Saint-Vel*, Gaz. de Paris, 1871, pp. 9 and 12.—*Spiegelberg*, Arch. f. Gyn., B. V., p. 411.

Hypertrophic conditions of the cervix differ so much in accordance with the portion of the cervix affected, that we are compelled to consider them separately, even though we do not include the follicular hypertrophy of the lips, which, as proceeding merely from the mucous membrane, and genetically identical with mucous polypi, we shall discuss in the chapter on cervical catarrh.

The cervix, to describe it accurately, should not be divided into two sections—an infravaginal and a supravaginal—but, in

accordance with the different insertions of the anterior and posterior vaginal walls, into three portions. In Fig. 29, *a*, that part of the cervix situated below the insertion of the anterior vaginal wall designates the true infravaginal portion of the cervix; *c*, that part situated above the insertion of the posterior vaginal wall, the true supravaginal portion; while *b* represents the section between these two portions, being supravaginal in front, and infravaginal behind. Each of these three portions may become hypertrophic by itself, and present a pathological condition totally different from the others.

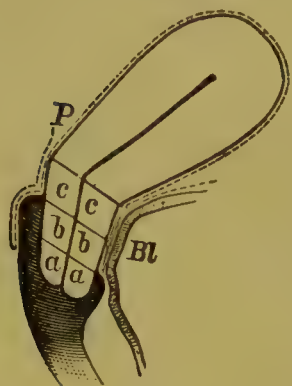


FIG. 29.

Division of the cervix into three portions. *P*, peritoneum; *Bl*, bladder; *a*, infravaginal portion; *b*, middle portion (infravaginal behind, supravaginal in front); *c*, supravaginal portion.

Let us first consider the hypertrophy of the portion *a*, the infravaginal portion proper.

HYPERTROPHY OF THE INFRAVAGINAL PORTION.

C. Mayer, Virchow's Archiv, 1856, B. X., S. A., p. 21.—*C. Braun*, Zeitschr. d. Ges. d. Wiener Aerzte, XX., 1864, p. 43.—*Simon*, M. f. Geb., B. 13, p. 424.—*Säzinger*, Prager Vierteljahrschrift, 1866, I., p. 120.

Etiology.

The causes of general "peniform" hypertrophy of the infravaginal portion are entirely unknown. Parturition cannot be specially blamed for it, because the most typical cases have occurred in nulliparæ. Labor and the puerperal state are followed by other varieties of enlargement of the infravaginal portion, viz., an irregular, nodular hypertrophy, dependent on cervical inflammation, and coming under the head of chronic metritis and peculiar hypertrophic changes of configuration, which occur with particular frequency in large lateral lacerations of the cervix.

Pathological Anatomy.

The variety to be described here is characterized by the uniform hypertrophy of all the elements; the infravaginal por-

tion of the cervix is normally constituted, and its thickness is generally but little increased; its length only is unusual. The mucous membrane remains unchanged, becoming hypertrophied only so far as is necessary to cover the elongated infravaginal portion.

Occasionally, in women who have borne children, only one lip is hypertrophic, and may assume the most peculiar shapes. The highest degree, however, of pathological development is found in nulliparæ, in whom the infravaginal portion may attain such a size as to project from the vulva in the shape of a conical body, somewhat resembling the erected penis.

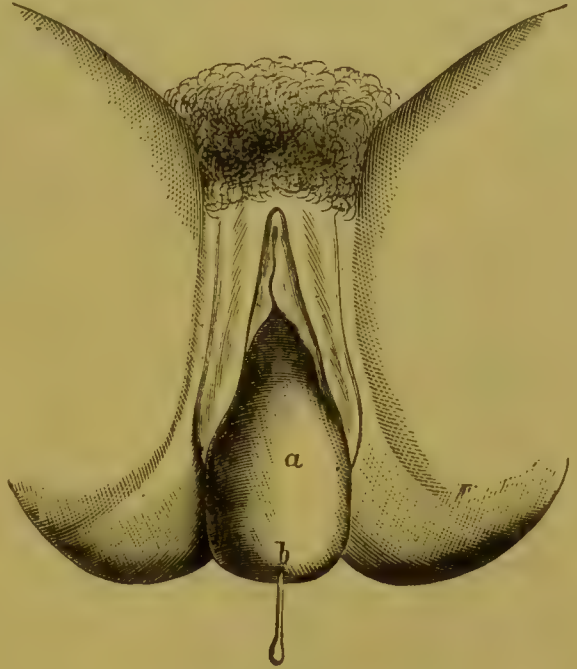


FIG. 30.

True hypertrophy of the infravaginal portion.

a, the hypertrophic infravaginal portion protruding some distance from the vulva; *b*, the narrow external os.

The vaginal portion is firm and dense, and closely covered by the mucous membrane; the external os is unusually small. In the case observed by me (represented in Fig. 30) an ordinary uterine sound could not be passed through the narrow os, from which hung a drop of mucus. (Figs. 30 and 31.)

Symptoms.

The increase in volume does not in itself appear to cause great inconvenience, because the existing symptoms are exclusively due to the external protrusion of the growth. They thus resemble those commonly found in prolapsus, but the hypertrophic elongation seems more sensitive, and therefore, lying, as it does, between the labia and thighs, usually causes great distress.

It will usually be found that a certain amount of discharge—

perhaps produced only by the mechanical irritation of the tumor—has been going on for some time, and is still present.

Diagnosis.

A careful examination will serve to distinguish this condition from all others. On conjoined manipulation we find the body of



FIG. 31.

The same case, seen in a pelvic section.

the uterus in its normal position, and on examination per vaginam, the cervix is felt to merge everywhere uninterruptedly into the tumor, which projects free into the vagina, and can, therefore, be nothing else than the elongated infravaginal portion. Thus these physical signs fully suffice to differentiate this affection from polypus, inversion, and prolapsus, as well as from the supravaginal hypertrophy of the cervix. If the vaginal insertion is at its normal altitude in front and behind, only that portion of the uterus projecting into the vagina is hypertrophied. The hypertrophy of one lip is detected with still greater facility. An internal exploration

shows us that the tumor is continuous with the lip, and in the same manner this form of hypertrophy may be distinguished, by the regularity in shape and uniform firmness of texture, from the affection known as follicular hypertrophy (to be described hereafter).

Prognosis.

If left to itself the tumor, when once it has passed the ostium vaginæ, does not diminish, because from that time forth it is exposed to continual irritation, which excites it to still further enlargement.

Treatment.

A cure is possible only by amputation, a not very dangerous operation, as an injury to the adjacent parts can easily be avoided, inasmuch as the infravaginal portion alone has grown downwards, and neither the bladder nor the peritoneum of Douglas's cul-de-sac extends into the tumor (Fig. 31). Since, furthermore, it is not necessary to amputate directly below the vaginal insertion, but only somewhat above the entrance of the vagina, owing to the fact that the involution always following the operation completes the process of reduction, injuries of the organs named do not occur during the operative cure of this variety of hypertrophy. The hemorrhage is, however, usually very considerable.

The operation may be performed with the wire *écraseur*, which divides the dense tissue smoothly and thoroughly, with the galvano-caustic loop, or with the knife or scissors.

I prefer to operate with the knife, because neither the *écraseur* nor Middeldorpff's galvano-caustic apparatus prevents hemorrhage with absolute certainty, and their use excludes the suture, the most reliable hæmostatic.

If the tumor, as is usually the case, is not very voluminous, the following *modus operandi* is to be recommended: a thin linen bandage is passed around the tumor immediately below the vaginal insertion, and twisted so as to firmly compress the hypertrophic infravaginal portion. We thus possess

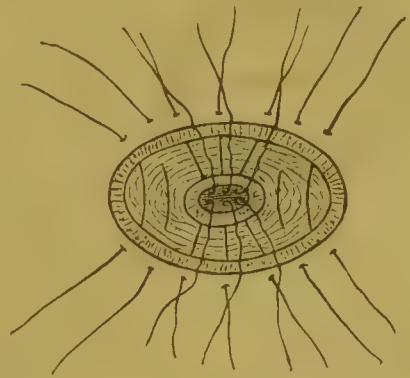


FIG. 32.
Sutures, after amputation of the infravaginal portion.

a means of fixation of the tumor during the operation, and are enabled to operate without hemorrhage, because the loop completely compresses the afferent vessels. Should an artery spirt, nevertheless, during the division, the bandage need only be twisted tighter, until the hemorrhage ceases.

The tumor is now drawn down somewhat, and that portion below the vaginal entrance removed; the sutures are then at once

applied, the cervical mucous membrane being united with the vaginal mucous membrane over the stump, and the gaping lateral edges being stitched together, as represented in Fig. 32, after the manner recommended by Hegar,¹ Simon, and Spiegelberg.²

Sims applies the sutures in such a manner (Fig. 33) as to approximate the edges of the vaginal mucous membrane on the anterior surface of the stump to those of the membrane on the posterior surface, without regard to the mucous membrane of the cervical canal. Sutures thus applied have the great disadvantage of not surely controlling the hemorrhage, because blood may collect between the surface of the stump and the united mucous membrane loosely covering it, and so necessitate the opening of the wound. A cicatricial contraction of the external os may also result.

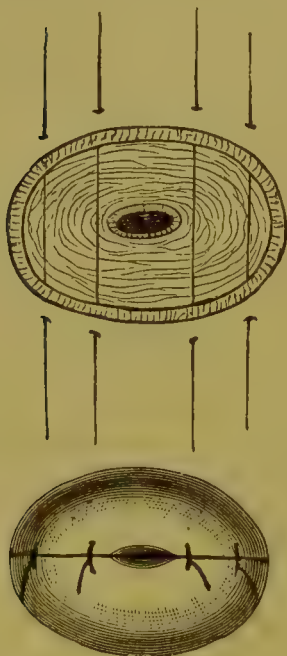


FIG. 33.
Sutures according to Sims.

If the infravaginal portion is unusually voluminous, it is better to incise it laterally, excise a wedge-shaped piece from each lip, and unite the edges of the wound by deep parenchymatous sutures, after the manner to be described in the operation for median hypertrophy.

Particular stress should be laid upon the fact that, by means of amputation, the cervix is not only shortened to the extent of the piece removed, but in consequence of the division of its large vessels the nutrition of the whole cervix is so materially impaired as to give rise to a fatty degeneration and involution similar to that which takes place after parturition.

HYPERTROPHY OF THE SUPRAVAGINAL PORTION OF THE CERVIX.

Virchow, Verh. d. Berl. Ges. f. Geb., II., p. 205.—*C. Mayer*, M. f. Geb., B. 11, p. 163.—*Scanzoni*, Beitr. z. Geb. u. Gyn., IV., p. 329.—*C. Braun*, Zeitschr. d. Ges.

¹ M. f. Geb., B. 34, p. 395, and Tageblatt der Wiener Naturforschervers, p. 176.

² L. c., p. 440.

d. Wiener Aerzte, 1864, p. 43.—*Martin*, M. f. Geb., B. 20, p. 203.—*Barnes*, Brit. Med. J., January 7, 1871.—*Spiegelberg*, Berl. klin. W., 1872, Nos. 21 and 22.—*Goodell*, Prolapse of the Womb. Phila., 1873; and, Some Practical Hints, etc., Med. and Surg. Reporter, Jan. and Feb., 1874:

We shall consider here only those cases in which that portion of the cervix becomes hypertrophic which is situated above the insertion of the posterior vaginal wall, viz., part *c* in Fig. 29, and exclude at the same time the secondary hypertrophy of the cervix, which is only the consequence of prolapse of the uterus.

Etiology.

Although in certain individual instances this supravaginal hypertrophy arises from unknown causes, similar to those occasionally underlying infravaginal enlargement, still in a large number of cases this condition must be regarded as the consequence of a primary prolapse of the vagina,—an etiological fact already pointed out by Cruveilhier, and recently alluded to with special stress by Spiegelberg.

It will be readily understood that the prolapsing vagina exerts general omnilateral traction on the cervix. If, as is usually the case, all the conditions favorable to prolapse of the uterus are also present (relaxation of its attachment to the adjacent parts), a secondary prolapse of that organ is the natural consequence. Should the uterus, however, be retained in its position by normal or pathological supports, and thus be unable to follow the traction of the vagina, a drawing out of the cervix in a downward direction easily occurs



FIG. 34.

Hypertrophy of the supravaginal portion of the cervix.

a, body of the uterus; *b*, hypertrophy of the cervix; *c*, bladder; *d*, diverticulum of the bladder.

—usually not merely a simple elongation with attenuation, but, through the irritation, an increase in bulk of the whole cervix.

This causal connection was evidently the case in the specimen represented in Figs. 34 and 35, in which the vagina was so completely prolapsed, that no trace of a vaginal cul-de-sac could be detected at the normal spot behind the urethra and in front of the frenulum, and the deeply prolapsed external os was almost covered and hidden from sight by the overlapping folds of the vagina (Fig. 35). The condition of the vagina shows that it was not secondarily dislocated by the downward growth of the cervix, but that the latter was drawn down by the prolapsed vagina.

Pathological Anatomy.

In this variety of hypertrophy, the body of the uterus contributes but very little to the marked elongation of the organ, which generally amounts to nearly six inches (fifteen centimetres); the hypertrophy is confined chiefly to that portion of the

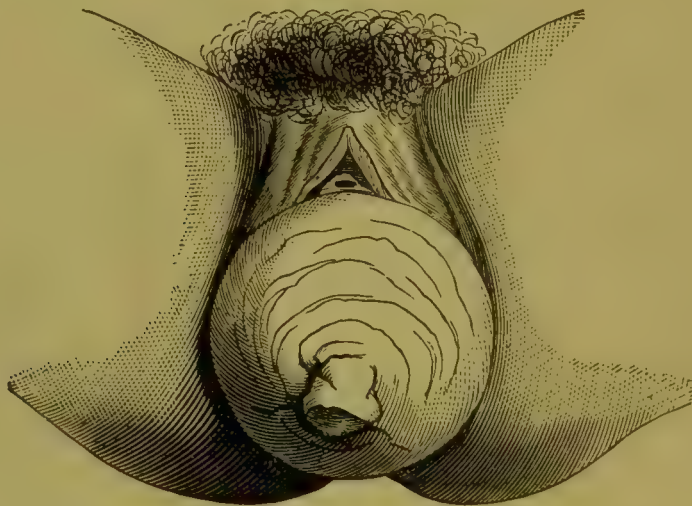


FIG. 35.

The same supravaginal hypertrophy; anterior view.

cervix which is situated above the vaginal insertion. As a rule, this condition is due, as stated above, to the primary prolapse of the vaginal mucous membrane. But in the other class of cases, when the upper portion of the cervix grows downwards, the

vaginal cul-de-sac must necessarily follow, and the vagina becomes more inverted, the more considerable the hypertrophy, until finally, becoming turned entirely inside out, it protrudes from the body.

The external os is thus found very low down, protruding from the vulva and covered by the inverted vagina (the condition is not distinguishable by the eye alone from prolapsus, as Fig. 35 shows), whereas the fundus is situated at its normal height, or but little lower, occasionally even somewhat higher than usual.

The relations of the adjacent organs are here of supreme importance. Supravaginal hypertrophy differs essentially from infravaginal elongation, in that the latter affection merely denotes the extension of the infravaginal portion (*a*, in Fig. 29), into the vagina, whereas, in the former (*c*, in Fig. 29) the neighboring organs, particularly the bladder and retro-uterine peritoneum, occasionally also the vesico-uterine duplicature of the peritoneum, which are closely attached to the upper part of the cervix, are dislocated downwards during the growth of the latter.

The extent of this dislocation is exceedingly variable; a diverticulum of the bladder, and the retro-uterine peritoneum, however, are generally displaced so far downwards in this variety as to reach to the tip of the tumor. The ante-uterine peritoneal duplicature usually remains unchanged.

Symptoms.

The appearance and symptoms of supravaginal hypertrophy resemble those of prolapsus uteri so much that these two conditions are very often mistaken for each other; in fact, the resemblance is so strong that Virchow termed the former affection "prolapse of the uterus, without descent of the fundus." The symptoms also are identical with those of prolapse, and depend almost entirely on the presence of a tumor in front of the vulva. Even though the pain and actual discomfort may at times be slight, still the same troublesome and annoying consequences are present as in prolapse.

Menstruation may be regular, but is often profuse and continues long beyond the climacteric period.

The distressing consequences of cystocele (stagnation and decomposition of the urine with consecutive vesical catarrh) may be wanting, if, as in the case represented in Fig. 34, the hypertrophic cervix is so voluminous as to compress the entrance to the cystocele (the catheter could be introduced only with some difficulty, and even when the bladder was full, the pouch did not contain a drop of urine).

Diagnosis.

We shall consider here particularly the differential diagnosis from prolapse, because this disease at first sight is always taken for it, and it is easily distinguishable from other tumors found outside of the vulva (inversion, polypus). To mistake a simple prolapse of the vagina or uterus for a supravaginal hypertrophy is scarcely possible, because palpation and the sound determine the normal length of the uterus. It is therefore very easy to ascertain that, whilst the external os is situated outside of the vulva, the fundus remains at its normal height, and the cavity of the uterus is considerably elongated.

This condition proves that the case is not one of simple prolapsus uteri, and the inverted and displaced vagina clearly distinguishes the affection from hypertrophy of the infravaginal portion.

It may be very difficult to decide in these cases whether a primary or secondary hypertrophy of the cervix is present. By primary we mean the hypertrophy at present under discussion, in which the fundus has always remained at its normal height, the growth of the cervix downwards alone causing the disorder. There is no doubt, however, that secondary hypertrophy may occur; that is, that there are instances in which there was first a simple prolapse of the uterus, in consequence of which the organ gradually became so much enlarged as to attain, with its fundus, quite or almost its original altitude.

Anatomically, also, the two conditions resemble each other very much. In primary prolapsus, the bladder in front, and

Douglas's cul-de-sac behind, sink down with the uterus, and remain down, even when the upper portion of the cervix grows upwards, and these same parts, being intimately connected with the cervix, are displaced downwards in the same manner as in primary hypertrophy of the cervix.

It may, therefore, be exceedingly difficult to differentiate with absolute certainty between the two conditions.

The chances will be in favor of primary hypertrophy, if the fundus remains at its normal height, and the prolapse of the vagina is primary; that is, if the vagina (see Fig. 34) has prolapsed so completely as to throw itself into folds below, which are not filled out by the enlarged uterus.

The hypertrophy is secondary, however, if the uterus presents the appearance of having been pressed downwards with great force, so as to completely invert the vagina, or the traction outwards and upwards of the tense vagina has everted (ectropionized) the external os. Additional certainty is given to this diagnosis if the bladder and retro-uterine peritoneum are situated rather high up,—a rare occurrence, to be sure, due to their secondary elevation by the growth of the cervix upwards. Such cases have been reported by Martin,¹ Scanzoni,² and R. Barnes.³

Prognosis.

Without medical assistance the disease is very distressing and deleterious to health. The part situated outside of the vulva is exposed to constant irritation, and consequently does not decrease in size, but is continually inclined to enlarge still further. Ulceration, a discharge of sanious pus, or more rarely the dangers occasionally accompanying prolapsus, sooner or later make their appearance.

Treatment.

The amputation of the lowest portion of the cervix is very

¹ M. f. Geb., B. 34, p. 328.

² Beitr. z. Geb. u. Gyn., IV., p. 332.

³ Brit. Med. J., Sept. 30, 1871.

difficult of execution in this variety, because the bladder and Douglas's pouch extend down to the apex of the tumor. Hegar has, indeed, recommended for these cases his method of conical excision,¹ in which the incision is made obliquely upwards, terminating in the cervical canal at a point higher up than the external wound, and thus excising a funnel-shaped piece from the cervix.

But not even by this operation will it be possible to remove the whole portion exterior to the vulva, and subsequent involution will in aggravated cases hardly bring about a sufficient diminution of the hypertrophy.

Inasmuch as but little improvement is to be expected from an operation in true supravaginal hypertrophy, and the danger of wounding the peritoneum is very great (the bladder, too, should not be injured, and by aid of the catheter we may ascertain how

far down it has descended), the question arises, whether there are no other means by which palliative assistance, at least, may be rendered, the discomforts diminished, and the patients enabled to attend to their daily duties.

The replacement, that is, the return of the external parts within the vulva, although at first sight impracticable, owing to the fact that the fundus is located at its normal height, is still possible by means of an acute flexion of the uterus. In the case represented in Figs. 34 and 35, I replaced the uterus without great difficulty, leaving it in the position shown in Fig. 36, in which it was retained by one of Mayer's hard-rubber ring pessaries. Upon the return of the patient, four days later,



FIG. 36.

Replacement of the uterus in a case of supravaginal hypertrophy of the cervix.

¹ See the passages quoted above, and Hüffel, *Gebärmutter und Scheidenvorfälle*. Freiburg, 1873, p. 44.

the uterus still retained the same position, and the patient expressed herself quite contented with her condition. Unfortunately she did not return a third time, probably only because her state had become endurable.

It will therefore depend on further observations to show how far a hypertrophied uterus is capable of involution while supported by a pessary in the manner just described. Huguier also saw good results from the use of pessaries in mild cases, and recommends a T-bandage, whenever the uterus can be returned within the vulva.

If pessaries prove insufficient, the conical excision of the cervix may be tried. The cervix can be amputated quite high up, if, after the manner to be described in the next chapter, the anterior vaginal wall with the bladder, and the posterior wall with the peritoneum, be dissected off from the cervix for a short distance, and a conical piece be then removed from the latter.

HYPERTROPHY OF THE MEDIAN PORTION OF THE CERVIX.

When the middle portion (part *b*, in Fig. 29) of the cervix is the chief seat of the hypertrophy, the symptoms will differ from those already described, because this part is supravaginal at the anterior and infravaginal at the posterior lip. These cases are more common in my experience than the two other varieties, although, with the exception of a case by Graily Hewitt¹ (represented in diagram but not described in the text) I do not find this form of cervical hypertrophy mentioned in the literature of the subject.

Etiology.

As a rule, this condition is doubtless induced by prolapse of the anterior vaginal wall, which elongates the anterior lip by downward traction and provokes its enlargement. That portion situated above the attachment of the anterior vaginal wall therefore becomes hypertrophied (*b*, in Fig. 29). The middle section, *b*, of the posterior lip also increases in size. The traction of the

vagina in these cases is followed, exceptionally, not by prolapse of the uterus, but by hypertrophy of the cervix, which result is

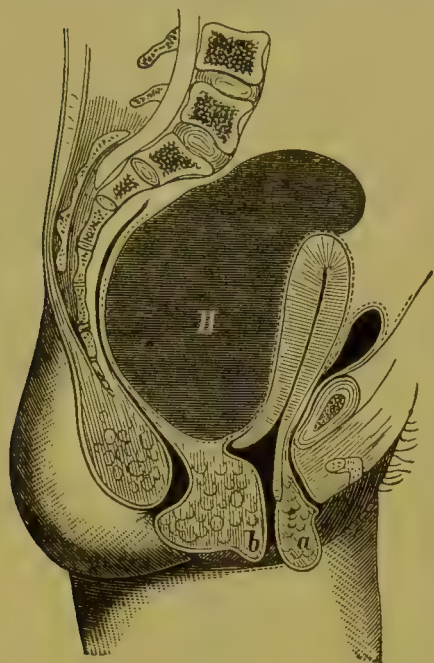


FIG. 37.

Retro-uterine hæmatocele, *H*, with elongation, particularly of the anterior lip, in consequence of the high degree of prolapse of the anterior vaginal wall, *a*. Moderate prolapse of the posterior vaginal wall, *b*.

very much facilitated, if the uterus is at the same time retained by pathological adhesions in its normal position, and thus prevented from yielding to the traction from below. In five cases of this kind observed by me, the uterus was thrice held fast at the brim of the pelvis by perimetritic adhesions, and once by large fibroids.

matocele observed by me also illustrates this point, and clearly shows how the cervical hypertrophy begins. Fig. 37 shows how the unusually deep prolapse of the anterior vaginal wall, *a*, has elongated the anterior lip.

Pathological Anatomy.

The uterus will be found to have undergone a considerable elongation, confined exclusively, or at least nearly so, to the middle portion of the cervix (*b*, in Fig. 29). This hypertrophy, as shown by the examination by Crevet¹ of two amputated cervixes, is entirely limited to the connective-tissue elements. There were so very few muscular fibres as to warrant the assump-

¹ Inaug. dissert. Erlangen, 1874.

tion that in connective-tissue hypertrophy the existing muscular elements become partly destroyed. (It can scarcely be doubted that these observations also apply to the other forms of cervical hypertrophy.) As the middle portion is closely attached to

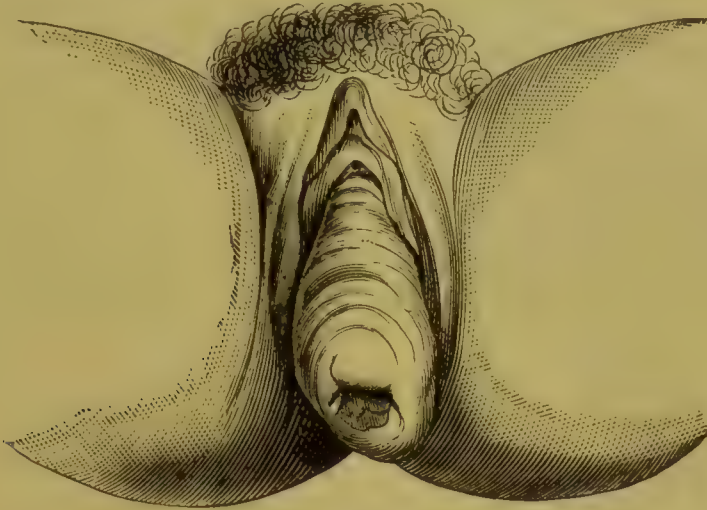


FIG. 38.

Case of median cervical hypertrophy.

the bladder, it draws down in the course of its growth a pouch of the latter, and as it is situated above the vaginal insertion, the anterior vaginal cul-de-sac also becomes dislocated downwards. At the posterior lip, the hypertrophy of the median portion assumes an entirely different aspect, because there the middle portion is situated below the posterior vaginal attachment, and the hypertrophy therefore is entirely intravaginal. For this reason, we find in the tumor, which lies in front of the vulva and is often mistaken for a prolapsus uteri, anteriorly, a pouch of the bladder extending either quite to the tip of the protruding mass, or nearly to it, and the anterior vaginal cul-de-sac effaced or very shallow. Posteriorly the condition is quite different; there the vault of the vagina still remains at its normal height, or is but slightly depressed, and the peritoneal duplicature of Douglas's cul-de-sac does not extend into the tumor.

Symptoms.

These entirely resemble those of the preceding variety, and consequently those of prolapsus uteri.

Diagnosis.

Hypertrophy of the median portion of the cervix cannot possibly be mistaken for anything else, because the normal relation of the posterior vaginal cul-de-sac, compared with the low position of the anterior, is very characteristic.

Treatment.

In contradistinction to the preceding variety, this form is exceedingly amenable to operative treatment. I have operated on three cases after the following method, which, if I correctly understand the description given in the *Am. Jour. of Med. Sc.* for 1871 (p. 173), resembles that recommended by Taylor.



FIG. 39.

Pelvic section of the case represented in Fig. 38.

a, body of the uterus; *b*, elongated cervix; *c*, short anterior vaginal cul-de-sac; *d*, normal posterior vaginal cul-de-sac; *e*, pouch of the bladder. The dotted line indicates where the incision was made in the amputation.

The patient having been anæsthetized, the cervix is seized and steadied by Muzeux' double tenaculum, and incised bilaterally up to the point where the posterior lip is to be amputated. The excision of the posterior lip is then performed by cutting out a wedge-shaped piece in such a manner that the remaining cut surfaces will exactly fit each other; the sutures to hold them in contact should be introduced at once after making the incisions (see Fig. 43, *aa*). The sutures are introduced into the cervical mucous membrane, are then passed deep through the cer-

vical tissue, and brought out at the very apex of the wedge. The needle is again introduced close by, passed deep into the parenchyma, and brought out near the posterior line of incision. The sutures are then at once firmly tied.

The amputation of the anterior lip is then performed in

the following manner: The mucous membrane of the anterior lip is divided by a transverse incision about one centimetre below the apex of the vesical pouch, and the incision is then carried obliquely upwards through the substance of the lip towards the cervical canal, terminating at the point of amputation of the posterior lip. The sutures are applied in the same manner as described for the posterior lip; that is, the needle is first introduced into the mucous membrane of the cervical canal, then brought out at about the middle of the surface to be united, then reintroduced close by, and, always passing deep through the tissues, is brought out close above the divided mucous membrane of the anterior lip.

In order to avoid injuring the bladder during the amputation of the anterior lip, it is advisable to introduce a male catheter (see Fig. 43) into the cystocele, and with its point to lift the lowest fold of the vesical mucous membrane as far as possible from the tumor.

If the cystocele extends

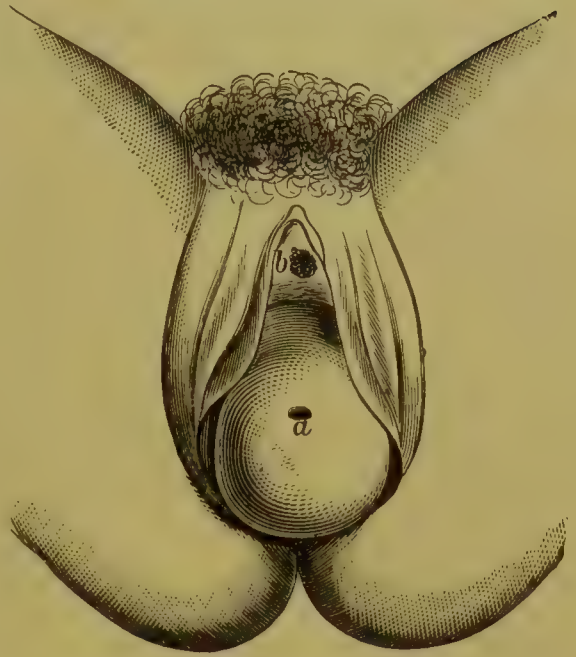


FIG. 40.

Case of median hypertrophy of the cervix.

a, external os; *b*, papillary excrescence at the urethral orifice.



FIG. 41.

The same case as that represented in Fig. 40, in pelvic section.

The uterus is held fast above by large fibroid tumors.

down to the apex of the tumor, the incision should be made close below it, and the vaginal mucous membrane dissected off from the cervix for a short distance before carrying the incision deep into the tissues.

When both lips have been united by sutures, the gaping lateral incisions should also be closed by a few deep sutures.

The hemorrhage from the incisions, which is occasionally profuse, may best be prevented by passing a strip of linen around



FIG. 42.

Median hypertrophy of the cervix.
The dotted line indicates the point of amputation.

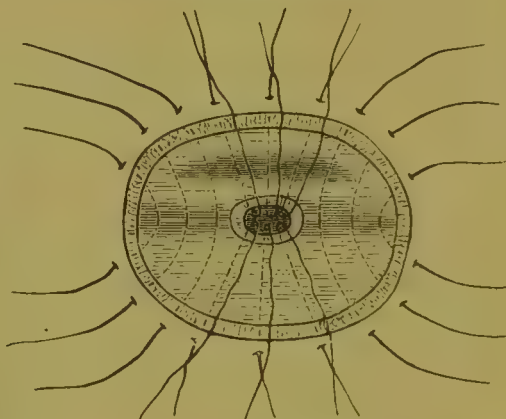
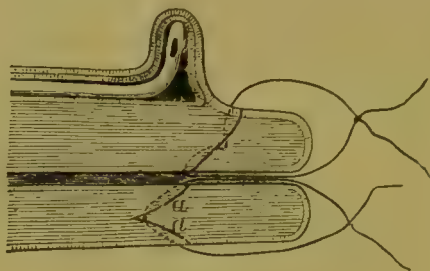


FIG. 43.

Amputation of the cervix in median hypertrophy, shown above by a sagittal, below by a transverse section.

the cervix, above the point of amputation, in the manner already described above, and compressing the tumor by means of torsion. This strip also serves as an excellent means of manipulating the tumor during the operation.

The operation performed in this manner is not dangerous, because the peritoneum, being situated high up, can scarcely be injured, and the cystocele, the depth of which is easily ascertained, can be avoided. Secondary hemorrhage may be entirely

prevented by the deep parenchymatous sutures, also recommended by Hegar.¹

The separate amputation of the two lips, after bilateral division of the cervix, is necessary in this form of hypertrophy, because only in this manner can the amputation be performed at a higher point behind than in front. This mode of operating is rendered advisable by the size of the tumor itself, which is often so great as to cause the stump, after the sutures have been applied, to resemble that of an amputated limb.

The subsequent involution of the uterus is very complete.

ATROPHY OF THE UTERUS.

Kiwisch, Klin. Vorträge, etc., 4 Aufl. Prag, 1854, B. I., p. 142.—*Chiari*, Ch., Braun u. Spaeth, Klin. d. Geb. u. Gyn. Erl., 1852, p. 371.—*Simpson*, Diseases of Women. Edinburgh, 1872, p. 597.—*Klob*, Pathol. Anat. d. weibl. Sexualorg., p. 205.—*Scanzoni*, Lehrb. d. Krankh. d. weibl. Sex., 4 Aufl., B. I., p. 81.—*Jaquet*, Berl. B. z. Geb. u. Gyn., B. II., p. 3.

Etiology and Pathological Anatomy.

Omitting primary congenital atrophy, which we have already considered, the following forms of acquired atrophy of the uterus are to be distinguished :

Senile atrophy occurs in conjunction with atrophy of the other genital organs. The vagina becomes unusually short and smooth, the infravaginal portion of the cervix disappears, the external os is a small opening bounded by thin folds, and the uterus is small and flabby, with attenuated walls. The internal os is not unfrequently constricted, giving rise to a usually slight degree of hydrometra. The vulva also becomes atrophic, the clitoris is merely a small nodule devoid of prepuce and frenulum, and the nymphæ may be so completely effaced as to leave the vulva bounded laterally only by the labia majora, which are also atrophic.

Senile atrophy is usually confined to an advanced period of life, after the sixtieth year, and is frequently wanting even

¹ *Hüffel*, p. 46.

then ; for the uterus may remain normal in size, or even abnormally enlarged, till very late in life. If atrophy occurs sooner, close upon the menopause, or if exceptionally the climacteric period, and with it the atrophy, appear before the usual time, it frequently causes morbid symptoms, such as sacralgia, debility, mental depression, hysteria.

The occasional occurrence of an atrophic uterus in chlorosis has also been referred to. This atrophy, however, is scarcely acquired ; I at least have never seen a case of this kind in which it was probable that the uterus had formerly been more fully developed.

Puerperal atrophy takes place in various ways, viz. :

(1.) In the beginning of the puerperal state, particularly in tuberculous women, but also in those ill with puerperal fever. The change in the uterus depends on defective involution, combined with incomplete regeneration ; that is to say, the old uterus undergoes fatty degeneration, but the products of that degeneration are not completely absorbed, and the new muscular fibres are but imperfectly formed. The walls of the uterus are thick, but soft and pulpy. Klob gives the following description of this form : “The uterine tissue is grayish-yellow or yellowish-red in color ; very friable and delicate mucous threads, like spiderwebs, stretch across the laceration.”¹

This variety of atrophy has of late attained some importance from the fact that even a careful sounding of the uterus may produce a perforation of the pulpy wall. Such a perforation, however, may heal, as I once had the opportunity of observing at the post-mortem of a woman who died of tubercular disease a year and a quarter after the perforation of the uterus had taken place. The uterus was normal in density, and rather thick. The cicatrix of the perforation could not be recognized with certainty.

(2.) Puerperal atrophy occasionally occurs in a gradual manner in anæmic, badly nourished women, who have nevertheless passed through a normal confinement and puerperal convalescence. With them, even though they do not nurse their children, menstruation does not reappear ; they look prema-

¹ *Klob*, l. c., p. 207.

turely aged, and always suffer from a variety of symptoms: peculiar subjective sensations in the abdomen, sacralgia, mental depression, hysteria. The uterus in such cases is either merely very thin and flabby, and hardly recognizable by palpation, so that the sound in it can be felt through the abdominal walls with unusual distinctness (the cavity of the uterus being of the normal length), or the cavity is shortened, and the walls attenuated, although at times not flabby. Chiari describes two cases, which were associated with an uninterrupted secretion of milk.

In these cases we should endeavor by means of good nourishment and local irritation (cold douche, leeches to the cervix, introduction of the sound or intra-uterine stems, electricity) to restore the uterus to its normal condition.

(3.) A very marked atrophy may follow puerperal diseases, either after primary destruction of the parenchyma of the ovary (in peritonitis), of which the amenorrhœa and uterine atrophy are the consequences, or after serious disease of the uterus itself (septic endometritis), during which the mucous membrane and the innermost muscular layer were destroyed.

As a secondary condition, atrophy occurs, besides, in the following exceptional cases:

In *fibroids*, which may cause the almost complete absorption of the tissue of the uterus (hypertrophy, however, being the rule), especially if a number of tumors grow towards each other. At the autopsy a mass of fibroids is then found, without any appreciable uterine tissue. Through the pressure of other tumors (subperitoneal fibroids, ovarian tumors, plastic exudations) the parenchyma of the uterus may become exceedingly atrophic.

A parietal atrophy is frequently associated with an *elongation of the uterus*, a condition which may be produced by large tumors, or by puerperal adhesions of the uterus above the pelvic brim. The mere disappearance of the intravaginal portion, however, in these cases, is not to be considered as atrophy, for that part only of the cervix which projects into the vagina disappears; but if the elongation is extreme in degree, the walls of the uterus may become very thin, and even lesions of continuity may occur.

Scanzoni has, besides, observed several cases of atrophy of the uterus associated with *paraplegia*.

INFLAMMATION OF THE PARENCHYMA OF THE UTERUS— METRITIS.

Acute Metritis.

Boivin et Dugès, *Traité prat. des malad. de l'utérus*, etc., II. Paris, 1833, p. 198.—
Becquerel, *Traité clin. des mal. de l'utérus*, etc., I. Paris, 1859, p. 385.—*J. Henry Bennet*, *A Prac. Treatise on Inflammation of the Uterus and its Appendages*, etc. London, 1853, 3d ed.—*Mikschik*, *Zeitschr. d. Ges. d. Wiener Aerzte*, 1855, p. 500.

Etiology.

Menstrual congestion may increase to acute inflammation; this is especially likely to occur under the influence of cold, and also where there is an obstruction to the discharge of the menstrual fluid, as is the case in constriction or impermeability of the cervix due to flexion or tumors. The congestion accompanying the sexual act is less frequently followed by acute inflammation; but a typical metritis may occasionally occur as a consequence of gonorrhœal infection. A traumatic origin, such as a blow or fall on the abdomen, etc., is rare, always excepting surgical measures.

Of far more frequent occurrence is it after surgical applications which violently irritate the womb. Injections of too hot or too cold water into the vagina, vaginal pessaries pressing against the retroflected uterus, cauterizations of the cervix, intra-uterine injections, the introduction of the sound or of a stem-pessary, deserve especial mention as causative agents.

The inflammatory processes (purulent infiltrations) occurring in the neighborhood of cancer of the uterus, possess an entirely secondary importance.¹

Pathological Anatomy.

The uterus may swell to the size of a goose's egg; it is thick, hyperæmic, succulent, almost doughy. The whole substance is

¹ *Säzinger*, *Prag. Vierteljahrschrift*, 1866, 1, p. 130.

tumefied, infiltrated with serum, and hyperæmic, and ecchymose sars scattered throughout its tissues. Between the muscular fasciculi pus-corpuscles are found, usually only in small quantity, in some spots more abundantly

The endometrium, as a rule, is also inflamed, and the serous envelope always participates in the change, being either hyperæmic or bathed in pus, or else covered with flocculent deposits, or even thickened.

Symptoms.

Acute metritis is a very rare disease, but some authors are manifestly in the wrong when they deny its occurrence; in my own practice I have seen four well-marked cases.

It begins with violent fever, even with a sharp chill. Intense pain of a two-fold character is present: 1, a deep-seated pain in the cavity of the pelvis, similar to that met with in abortion during the early months, and 2, perimetritic pain, increasing on pressure, a sign characteristic of peritonitic trouble.

If the metritis comes on during the menstrual period, as is quite frequently the case, suppression of the menses is the usual consequence, although violent menorrhagia may also occur.

The uterus is found much swollen (see Fig. 44) and very sensitive, not only on pressure from without, but also when an attempt is made to raise it by pressing up the cervix with the finger in the vagina. The pain is most considerable on conjoined manipulation, when the uterus is grasped between the two hands.



FIG. 44.

Acute metritis on the third day of the disease.
" u, the swollen walls of the uterus.

Ischuria, diarrhœa, and tenesmus, with violent pain; also nausea, more rarely vomiting, are other ordinary symptoms.

Walking and standing, coughing, straining during defecation, in short, anything that increases intra-abdominal pressure, will create intense pain. Therefore perfect rest in bed, with elevated pelvis, is very soothing to the patient.

Acute metritis is always complicated with endometritis, and more or less perimetritis. The latter may, indeed, attain such a degree as to give rise to intraperitoneal exudation (see Fig. 45).

In uncomplicated metritis, after several days, the tenderness decreases and a complete restoration to the normal state ensues if a suitable régime has been observed. Very frequently, however, the sequel is chronic metritis, that is to say, there is left a moderate degree of sensitiveness and swell-

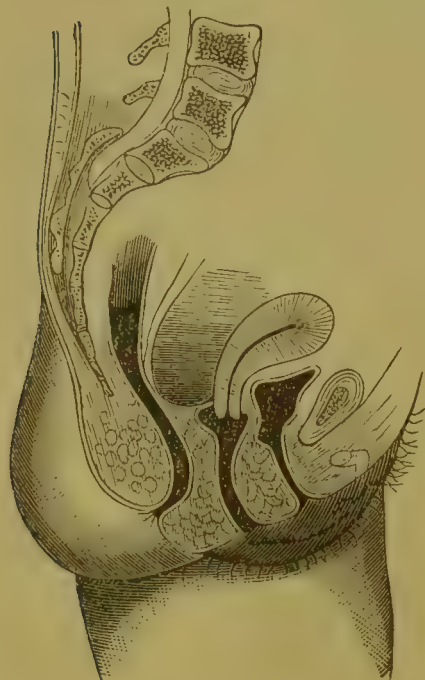


FIG. 45.

The same case on the sixth day of the disease. The uterus reduced in size and flexed. Peritoneal exudation in Douglas's cul-de-sac.

ing which undergo acute exacerbations from time to time.

The termination in the formation of an abscess is unusual. The abscess may become caseous—although this occurrence, of course, is rare—or it may perforate either into the peritoneal cavity, with fatal results, or more favorably into the cavity of the uterus; not unfrequently, however, after agglutination has taken place, it breaks into the rectum or through the abdominal walls.

Judging from the scanty notices of this subject in literature, abscesses of the uterus appear to be extremely rare, particularly if we except puerperal cases.¹ Scanzoni² and Lados³ observed abscesses with perforation into the abdominal

¹ Sâzinger, l. c., p. 131, and Kivisch, Klin. Vorträge, etc., II. Aufl., B. 2, p. 307.

² Krankh. d. weibl. Sexualorg., IV. Aufl., B. 1, p. 203.

³ Gaz. Méd. de Paris, 1839, p. 605.

cavity and fatal peritonitis. Bird¹ saw an instance of evacuation of the pus per rectum; Reinmann,² one of perforation through the abdominal walls. Kiwisch³ opened an abscess which had perforated into the uterine cavity through the anterior vaginal cul-de-sac, and Hervez de Chégoin⁴ rather indistinctly describes an abscess in the hypertrophic tissue of the uterus, which corresponded in size to the uterus at the fifth month of pregnancy; this abscess was opened by an incision through the abdominal walls. Ashford⁵ opened with a bistoury an abscess of the uterus which had been caused in a non-pregnant woman by efforts to induce abortion.⁶

I have myself seen two instances of large uterine abscesses, of which one, represented in Fig. 46, had formed during puerperal convalescence, after artificial separation of the placenta. When the abscess was near perforation through the adherent abdominal walls, it was opened by the attending physician, and discharged about a pint of pus. In the second case the abscess, which attained the size of a man's head, and finally broke into the rectum, followed close upon the careful introduction of the sound through the constricted cervix.

Diagnosis.

By conjoined manipulation we ascertain the marked enlargement of the uterus, particularly in its antero-posterior diameter, and its sensitiveness, which is not confined to the peritoneal envelope alone. Both these symptoms, together with the fever and the course of the disease (gradual detumescence of the



FIG. 46.

Abscess of the uterus.

u, uterine tissue: *a*, cavity of the abscess; *p*, portion adherent to the abdominal wall, at which point perforation took place.

¹ *Lancet*, 1843, Vol. I., p. 645.

² *Voigtel*, *Handb. d. Pathol. Anat.*, etc. Halle, 1805, p. 474.

³ *L. c.*, p. 305.

⁴ *Soc. de Chirurgie*, December 8, 1868; see *Gaz. hebdom.*, Dec. 18, 1868, p. 811.

⁵ *Columbia Hosp. Rep.* Washington, 1873.

⁶ The frequently cited case of *Bartholini* (*Hist. anatom. rarior.* Cent. I. Hist. 97, p. 137), which is expressly accompanied by the observation "sine pure" does not belong here.

uterus), render the diagnosis sufficiently certain. The sound should not be introduced, because it greatly increases the pain and inflammation.

It is not possible to diagnosticate abscesses of the uterus while they are still small. Larger collections of pus, however, are easily recognized, when it is possible to watch the slow but sure uniform increase in size of the uterus, and feel the fluctuation or, at least, firm elasticity produced by an accumulation of fluid. The adhesion of the enlarged uterus to the abdominal wall, when the abscess is on the point of perforating the latter, favors the supposition of the presence of pus. The sensitiveness of the uterus, moreover, when enlarged by an abscess, is but slight.

Prognosis.

The disease is never without danger, for death may ensue in consequence of suppuration or by the extension of the inflammation to the peritoneum. Chronic inflammatory conditions of the uterus are very prone to remain after the acute stage has subsided, and thus likewise render the prognosis unfavorable.

Treatment.

If an aggravated case is seen at an early stage, free local depletion, by means of scarifications of the cervix, in the manner to be described more in detail under the treatment of chronic metritis, will relieve the uterine congestion. If the pain is very intense and other symptoms of a participation of the peritoneum are present, the application of at least a dozen leeches to the abdominal integument above the symphysis pubis is advisable, and is to be followed, after the leech-bites have been allowed to bleed freely, by the application of ice to the abdomen. The scarification of the cervix should generally be repeated several times.

In addition, mild but effective laxatives, such as castor-oil, are indicated. Rest in bed, with depressed head and shoulders, and slightly elevated pelvis, is absolutely necessary, and frequently relieves the pain so much as to enable the patient to do without chloral or the hypodermic administration of morphine.

When the first acute symptoms have subsided, and the fever has diminished,—the uterus, although much reduced in size, still remaining greatly enlarged,—the moist and warm Priessnitz' compresses afford an excellent aid to absorption.

In cases so inclined it will be found difficult to prevent the formation of an abscess; a perforation into the abdominal cavity appears to be so rare that an artificial evacuation of the pus seems advisable only when the abscess can be reached with perfect ease and safety.

CHRONIC METRITIS—INFARCTION OF THE UTERUS.

Wenzel, Krankh. d. Uterus. Mainz, 1816, p. 54, etc.—J. Henry Bennet, Pract. Treat. on Inflamm. of the Uterus, etc. London, 1853, 3d ed.—Huguier, Gaz. des Hôp., 1849, No. 127.—Becquerel, Traité clin. des mal. de l'utérus, 1859, I., pp. 157, 251, and 403.—Nonat, Traité prat. des mal. de l'utérus. Paris, 1860, p. 112.—Aran, Leçons clin. sur les mal. de l'utérus. Paris, 1858, p. 491.—Seyfert, Spitals-Zeit., 1862, No. 38, and Säxinger, Prager Vierteljahrsch., 1866, 2, p. 152.—Oppolzer, Wiener med. Jr., 1858, No. 19.—Scanzoni, Die Chronische Metritis. Wien, 1863.—Klob, Pathol. Anat. d. weibl. Sex., p. 124.

The opinions of surgeons are as yet exceedingly divided on the subject of chronic inflammation of the uterus. Whilst formerly the greatest variety of affections, particularly scirrhus, were included under the terms infarction and engorgement, the later French authors, especially, now draw the finest distinctions between almost identical, or at least closely connected, pathological conditions of the uterus. Thus, Becquerel distinguishes, “*La congestion sanguine*,” 2, “*La congestion ou engorgement hypertrophique*,” and 3, the veritable “*inflammation chronique*,” and Courty considers *fluxion*, *congestion*, *engorgement*, and *métrite* to be quite separate affections.

In Germany there is so little uniformity of opinion on this subject, that some gynecologists pronounce chronic metritis to be the most common of all the diseases peculiar to women, and others almost deny the existence of such an affection. While Scanzoni includes under this term all the disturbances of nutrition which follow protracted venous hyperæmia, Seyfert believes infarction of the uterus to consist exclusively in defective puerperal involution and Klob, in his Pathological Anatomy of the

Female Sexual Organs, does not class the changes met with in infarction with the inflammatory processes, but with the neoplastic growths, and describes them under the name of "diffuse connective-tissue proliferation." Thomas¹ and Skene² call the disease "areolar hyperplasia," "diffuse interstitial hypertrophy," and "sclerosis uteri."

My conviction is, that we cannot dispense with the clinical picture of chronic metritis, for we should otherwise be obliged to separate closely connected pathological conditions having the same symptoms, and requiring the same treatment. Neither do I consider the term "chronic metritis" to be so very improper, because it is probably nothing more than a war of words, whether that condition be called a hyperplasia of the connective tissue of a hyperæmic uterus, or the product of an exceedingly chronic inflammation. Indeed, I should be loth to dispense with the name "inflammation" for this very condition, partly because the treatment needs to be decidedly antiphlogistic, and partly because in the early stages we always have the clinical symptoms of inflammation—hyperæmia, tumefaction, and pain.

It should be noted in addition that all the cases in which the rather rare termination in induration—a change which occurs only at a late stage—has not taken place, undergo from time to time exacerbations, which present the features of a subacute, occasionally of even a quite acute inflammation.

We therefore include under the term "chronic metritis" those cases also—placing them at the head of the list, because they are the most numerous—which originally arise independently of inflammation, such as defective puerperal involution, because inflammatory symptoms—hyperæmia, swelling and pain—occur during their course, and also because the treatment of these etiologically separate cases is decidedly antiphlogistic. Simpson,³ indeed, expressly states that in a case of defective puerperal involution, the treatment should be antiphlogistic, even though all positive signs of inflammation be wanting.

The collection of symptoms known as chronic metritis is thus

¹ Diseases of Women, 3d ed., p. 274.

² Amer. J. of Obstet., V., pp. 387 and 481, and VI., p. 353.

³ Diseases of Women. Edinburgh, 1872, p. 594.

made to comprise a large number of cases of etiologically different nature, but presenting clinically the same appearances and requiring the same treatment.

Etiology.

The hyperplasia of the connective tissue of the uterus accompanied by a variable degree of sensitiveness—this is, perhaps, the least reprehensible way of defining the condition in question—occurs under widely different circumstances.

Very frequently a defective involution of the puerperal uterus is the cause of the trouble. This is most prone to occur in cases in which, during the early part of puerperal convalescence, injurious influences of various kinds acted on the generative system, such as: leaving the bed at too early a date, and too violent action of the abdominal muscles, brought about either by heavy work or by physical exertions, such as severe cough, repeated vomiting, etc. ; further, retained blood-coagula and fragments of the secundines, grave puerperal diseases with para- and perimetritis, too early sexual intercourse, and other similar causes. Retarded in its metamorphosis by such influences, the uterus does not undergo perfect involution, the fatty degeneration and absorption of its muscular fibres are incompletely performed, or the newly formed tissues—muscular elements, and particularly connective tissue—are developed to such a degree as to leave the uterus considerably larger than normal. Miscarriages are especially injurious, partly because women are proverbially less careful after them than after regular confinements at term, although the uterus is obliged to undergo the same metamorphoses, and partly because in quite a number of cases conception again takes place before the involution of the uterus has been properly accomplished, in which case the proliferation of tissue is renewed and another miscarriage is then very likely to take place. Since nursing the child excites muscular contractions in the puerperal uterus, and these stimulate the process of degeneration of the cellular constituents to greater rapidity and completeness, the non-performance of this function on the part of the mother likewise aids in retarding involution.

We are not justified in designating this condition of defective involution in itself as chronic metritis, especially if it is merely a question of imperfect absorption of the muscular fibres, which had become immensely enlarged during pregnancy. A uterus retarded in its involution does not, however, remain stationary at this point; hence, in such a case, we are not dealing with a uterus which is simply enlarged, and which provokes symptoms merely by its size (by pressure on the neighboring organs and by its changed position), but rather with one which from being at first simply too large (after the puerperal state) gradually increased still further in size, became sensitive, and then was subject from time to time to acute exacerbations; presenting, in other words, the characteristic picture of chronic metritis.

In the next place, infarction of the uterus arises in consequence of continued or frequently recurring hyperæmia, no matter whether it results from active determination of blood to or permanent venous stasis in the organ.

Active hyperæmia may further be produced by all the various causes which induce a continued or often-repeated irritation of the uterus. In this category belongs the unfavorable influence exerted by frequent cohabitation under violent sexual excitement. Still more injurious are masturbation and the repeated imperfect performance of the sexual act, by reason of the impotence of the male.

Dysmenorrhœa, also, in consequence either of a constricted cervix, or of a flexion at the internal os, may lead to a chronic inflammatory condition of the uterus; this it may do by causing from time to time a retention of blood within the cavity of the uterus, and so exciting this organ to frequent contractions.

Continual or frequently repeated irritation of the mucous membrane may also give rise to protracted hyperæmia, and ultimately to chronic inflammation of the tissue of the uterus. Cases of neglected endometritis belong here, and also those not very rare cases in which there has been a repeated resort to non-indicated therapeutical measures, of which we will only mention the favorite practice of cauterizing the os with the stick of nitrate of silver.

The chronic hyperæmia of the uterus is far more frequently

caused by venous stasis in the organ, which is often due to displacement, particularly to retroflexion and prolapsus, and besides to adjacent tumors which mechanically impede the return of blood. We refer here less to real pathological neoplasms, such as ovarian tumors, than to the protracted retention of urine in the bladder, to which the female sex seems to be systematically educated, and particularly to the accumulation of fecal matter in the intestinal canal, which is habitual with most women, and especially with those in ill health. The stasis in the uterus is but rarely a part of the general obstruction in the system of the vena cava inferior, induced by disease of the liver, heart, and lungs.

The most uncommon mode of development of chronic metritis is that from acute metritis, which has undergone but partial restitution *in integrum*.

The origin first described, from defective puerperal involution, is by far the most frequent of all. For this reason, and also because some of the other causes usually, if not exclusively, operate in women who have borne children, it is only in exceptional cases that we see well-marked forms of chronic metritis in nulliparous women. Of one hundred and two patients, of whose cases I have kept special notes, there were only seven who had never been pregnant. Of these, two had an intact hymen; one masturbated; one had been married only a fortnight, and three, although married, were sterile. Of the other patients, three had only miscarried, while the others had passed through regular confinements: eighteen through one; eight through two; ten through three; eight through four; twelve through five; five through six; five through seven; five through eight; one through ten; and one through eleven, not counting the numerous miscarriages. Of the remaining nineteen patients, I find noted only that they had borne children. The large number of those who had been confined only once is explained by the fact that in nearly all of them the chronic metritis following puerperal convalescence entailed sterility.

Pathological Anatomy.

The characteristic feature of the process is the hyperplasia of the connective tissue; proliferation of the muscular fibres is either entirely wanting or occupies a secondary position.¹

The uterus is always enlarged, although usually not to a con-

¹ According to *Finn*, *Centralblatt für die med. Wissenschaften*, September, 1868, the enlargement is principally due to the proliferation of the muscular tissue.

siderable degree ; in rare instances, however, it may increase to such a size as to reach to the umbilicus. Veit,¹ indeed, saw a case in which the fundus projected two inches above the umbilicus, and the cervix extended so far down as to require the support of a pessary. The enlargement is pretty equally distributed over all the parts of the uterus, but the increase in thickness of the walls lengthens more especially the antero-posterior diameter of the organ.

The substance of the hypertrophied womb is soft, succulent, and reddish ; all its tissues are swollen and hyperæmic. The endometrium is usually also swollen and thickened ; at the os are found erosions and ulcerations, which we shall consider separately. The peritoneal envelope often shows ligamentous patches.

In some cases the enlargement of the cervix preponderates. The os is generally broad, and both lips are swollen and elongated ; occasionally they are soft and succulent, frequently, however, firm and irregularly hard, rendering the differential diagnosis from carcinoma exceedingly difficult. The cervical mucous membrane is not unfrequently ectropionized.

When the proliferating process has ceased, the newly formed connective tissue undergoes cicatricial retraction, the vessels become imperforate, and the young mucoid connective tissue becomes firm and fibrillated. The uterus then again diminishes in size, and on section exhibits an exceedingly firm, almost cartilaginous tissue, which creaks under the knife, and has a white, anæmic, cicatricial appearance.

Symptoms.

Since infarction cannot readily develop from that rare form of disease known as acute metritis, it must necessarily occur in the majority of cases as a consequence of the above-mentioned etiological factors.

Women who have been confined and were taken ill during puerperal convalescence, or who exposed themselves to severe

¹ *Frauenkrankheiten*, 2 Aufl., p. 367.

exertions and hard work soon after an early getting-up, find that, although always in good health before, they are not so well since their confinement. Sacralgia, abdominal pains, leucorrhœa, a sensation of weight and pressure in the pelvic region, menorrhagia, constipation, a frequent desire to micturate, all these distressing symptoms prevent the woman from enjoying perfect health. To be sure, these symptoms are not generally sufficiently severe to cause the positive sensation of actual illness. From time to time, however—every few weeks or months, sometimes with every menstrual epoch, although by no means constantly confined to that period—without apparent exciting cause, violent exacerbations occur. All the symptoms, especially the sacral and abdominal pains, become so intense as to confine the patient entirely to her bed. Not unfrequently a flow of blood will appear independently of menstruation. After a week or more the symptoms diminish, and the general condition of the patient becomes more tolerable, although still anything but agreeable. Sacralgia and the sensation of abdominal weight still remain. Obstinate constipation aggravates the difficulty very materially, for which reason most patients are accustomed to the regular use of laxatives.

Occasionally the period between these exacerbations may be passed in tolerable comfort ; but their constant return entirely precludes the sensation of perfect health.

The appearance of the symptoms in those cases in which the chronic metritis is induced by other causes is quite similar. Thus we are not unfrequently informed by girls who are suffering from ante flexion, or constriction of the cervix with consecutive dysmenorrhœa, that they enjoyed perfect health until the period of puberty. As soon as menstruation appeared, however, it was attended with pain, occasionally to such a degree as to cause convulsions and syncope shortly before the actual flow. For months and years the condition between the menstrual periods is entirely normal. Gradually a change takes place ; the intervals, which formerly were undisturbed, no longer remain so, and little by little there is developed the complex of symptoms described above. In primary endometritis, as well as in retroflexion and prolapsus, the body of the uterus often gradually

increases in size and becomes more tender, and the symptoms of these affections mingle with those of metritis,—the sacralgia and downward pressure excepted, as they are common to both. Thus finally, although the cause of the chronic inflammation differs in the cases mentioned, the same clinical features and the same symptoms present themselves to us, and we find ourselves justified in considering these several conditions as one and the same type of disease; of course, as in every affection, the etiological differences should be properly estimated.

An examination shows the following condition :

The uterus is enlarged, particularly in the antero-posterior diameter, and positively, although not always highly, sensitive; it is only in exceptional cases that there is no pain on pressure during the specially favorable intervals; at the time of the acute exacerbations, its volume enlarges, and its sensitiveness increases. The uterine cavity, as shown by the sound, is almost always elongated, but its walls are also thickened. In the more recent cases the consistence of the organ is not firm, but rather soft, at times even almost doughy, like the pregnant uterus at the third month.

The condition of the cervix varies. In persons who have not borne children it is but moderately enlarged, tapering conically towards the small external orifice. In other cases, in persons who have had children, and particularly if the usual complication of endometritis be present, the cervix is swollen and soft, or (in older cases) sometimes irregularly hard (as in carcinoma); the os is broad, its lips are thick, and the eroded, highly reddened mucous membrane of the cervix is everted and dotted with gray, translucent, rarely yellow, swollen follicles, containing pus.

Other complications, particularly of an inflammatory character, are not uncommon. Perimetritic adhesions to the other organs of the true pelvis and to the intestine, chronic ovarian disease, stenosis and atresia of the Fallopian tubes, with the formation of small tumors (partial hydrosalpinx), are not unfrequently met with. An overloaded intestinal canal often interferes exceedingly with conjoined manipulation. Menstruation is at times quite normal; in some cases the swelling of the cervix causes secondary dysmenorrhœa; metrorrhagia is very frequent.

This last symptom is most obstinate, if not most profuse, when the cervix is the chief seat of the disease.

Again we will call attention to the fact that, so far as our experience goes, the occurrence of acute and subacute exacerbations is the rule. At times, for weeks and even months the uterus is but little sensitive and only moderately enlarged, until the swelling again increases, and the acute sensitiveness and all the symptoms reappear.

In the course of time other features gradually show themselves. The digestion and appetite begin to fail, and the patients become debilitated. Pain of various kinds in the lumbar region and lower extremities, vaginodynia, coccygodynia, paralysis of different organs, and the whole train of hysterical symptoms follow.

Sterility is not the necessary, although the usual consequence of chronic metritis. It is caused not so much by the organic changes in the tissue of the uterus itself, as by the complications—endometritis, salpingitis, ovaritis, perimetritis, and displacements. If conception occurs, the pregnancy is often interrupted as late as the fourth or fifth month, a fresh, perfectly preserved foetus being expelled.

Terminations.

The disease known as chronic metritis may remain stationary a very long time—many years, indeed—in the manner already mentioned, viz., periods of comparative ease alternating with exacerbations of increased pain and discomfort. Even the menopause does not always bring about a cure. Occasionally the condition becomes almost unendurable exactly at the climacteric period, and then gradually the symptoms disappear. In other cases, however, the uterus remains in the state of chronic inflammation far beyond the age of fifty years; the menses continue during this time, or irregular hemorrhages take place. Still the inclination to relapses undoubtedly decreases after the menopause, and cases met with after that period are most amenable to treatment.

Even at an earlier age, however, a suitable course of treatment

will not unfrequently succeed in restoring the uterus to its normal state, as regards size and sensitiveness, and the removal of all distressing symptoms. There always remains, it is true, a greater or less tendency to a return of the disease.

In still other cases the affection proceeds to induration (described by Seanzoni as the second stage of chronic metritis). The newly formed connective tissue undergoes cicatricial retraction, the uterus becomes harder and smaller, and premature amenorrhœa occasionally supervenes. The worst symptoms, especially the acute exacerbations, however, cease, and this process must therefore be considered at all events as a relative cure.

Diagnosis.

The diagnostic difficulties are dependent less on the sifting and positive classification of the results obtained by examination, than on the exact limitation of the definition of the term chronic metritis. After what we have stated above it is not necessary to say more than that we diagnosticate this affection when we find the uterus uniformly enlarged, its walls thickened and generally sensitive, and when the case is chronic in character. As a rule, it is easy to detect these conditions, and difficulties in diagnosis will be met with only exceptionally.

For instance, the differential diagnosis from pregnancy is by no means always easy. The objective appearances may be nearly the same, for the size, shape, position, and consistence of the uterus are almost identical in both conditions. As a rule, however, in pregnancy the whole uterus is softer, a circumstance particularly noticeable in the succulent, thoroughly softened cervix. The sensitiveness, scarcely ever completely absent in chronic inflammation of the uterus, is wanting in pregnancy. The history gives us very valuable, although not always decisive points of difference. The most difficulty is met with when pregnancy occurs in a chronically inflamed uterus, a complication always to be kept in mind in making the differential diagnosis.

Submucous and interstitial fibroids may also offer diagnostic difficulties. In the former, it is true, the cervix becomes

shortened, whereas it is always enlarged in chronic metritis; and the abnormal contents of the uterus may be detected by the sound, or, in case of need, by dilating the cervix with sponge-tents. In interstitial fibroids, however, the uterus may be uniformly enlarged, and the marked hardness generally peculiar to fibroid tumors may be wanting in the individual case,—or, if the chronic inflammation has been of very long duration, the uterus may have become unusually hard. A distinct sensitiveness of the uterine tissue will, it is true, warrant the diagnosis of an inflammatory process, but not the exclusion of a fibroid. If the history also does not aid us, and the sound affords no information, then the cervix must be dilated with sponge-tents, and we shall then be able to detect by an examination with the finger whether one wall only is enlarged by a fibroid, or not.

Prognosis.

The disease is very tedious, and taxes the patience of the physician and patient to the utmost. Even though it does not directly threaten the existence of the patient, still the duration of her life is positively shortened by the disturbances of general nutrition, etc., which it produces, and occasionally a severe hemorrhage or the spreading of the inflammation to the peritoneum may prove exceedingly dangerous, and even fatal. The transition into carcinoma, which has recently again been asserted by Noeggerath,¹ is by no means a settled fact; on the contrary, it is a matter of surprise, considering the frequency of the two diseases, that patients afflicted with chronic metritis do not oftener eventually suffer from cancer.

Although not dangerous to life, as already stated, chronic metritis very materially embitters the existence. The patients never lose the sensation of being ill; their lives are nothing but alternations of periods in which they feel ill, but still not so much so as to incapacitate them from the ordinary duties of life, with those in which their sufferings are violent. The misery of the poor invalids is heightened by the usual accompanying

¹ Amer. Jour. of Obst., I., pp. 505 and 610.

secondary affections of the intestine—of which the principal one, constipation, aids in increasing the uterine inflammation—and by various hysterical sequelæ.

A spontaneous cure of the disease is probably never met with, certainly not before a very advanced age. It also obstinately resists treatment, and Scanzoni says, he never saw a case of complete recovery. This assertion is doubtless correct, if by recovery a complete *restitutio in integrum* is meant; but there is no question that by proper treatment the condition may be so much improved as to cause the entire disappearance of the symptoms; even in these cases of “cure,” however, a certain tendency to relapse always remains. *A priori*, one might suppose that an intercurrent pregnancy and puerperal convalescence would entirely remove the disease, because the old enlarged uterus normally undergoes almost complete involution; unfortunately, however, experience teaches us that this lucky event hardly ever happens; that, on the contrary, a new puerperal convalescence frequently aggravates the disease.

Although it will appear from the above remarks that the prognosis is not a very favorable one, still, we may usually expect by rational treatment to diminish the sufferings of the patient to a very great degree.

Treatment.

In accordance, therefore, with the importance which we have attached to the etiology of this trouble, it is of paramount importance to properly manage the diet during puerperal convalescence. It would carry us beyond our prescribed limits, however, to give here a detailed description of these dietetic measures.

In the next place we should see that, so far as may be possible, the patient be not exposed to repeated and protracted determinations of blood to the uterus, or to chronic hyperæmic conditions. Finally, we should call attention to the importance of a suitable treatment of acute metritis, endometritis, and uterine displacements; and in doing this we have mentioned the chief points of interest regarding prophylaxis,—at least so far as the avoidance of inflammatory uterine processes is concerned.

In order to prevent cases which at first are trivial in character from assuming the type of an inveterate chronic metritis, it is absolutely necessary that all cases of acute enlargement of the uterus, attended with sensitiveness, should at once be submitted to energetic treatment. Rest in the horizontal posture, avoidance of all injurious influences, particularly sexual intercourse, and repeated moderate local depletion in the manner presently to be described, are indispensable measures to be adopted until the uterus has regained its normal condition.

A case of well-developed chronic metritis calls for positive antiphlogistic treatment, which is to be the more energetic, the larger, softer, and more sensitive the uterus is.

If possible, the patient should enjoy complete rest, but at all events she should avoid all exertions which are likely to bring the abdominal muscles into active contraction (hard labor, jumping, also coughing and vomiting). It is positively injurious, however, for the patient to remain for a long time in bed or on a lounge, because the processes of nutrition and tissue-metamorphosis, which in this disease should be especially stimulated, are thereby interfered with. The patient should therefore be directed to continue her daily avocations, but at the same time to avoid any particularly active exertions; gentle exercise on foot, as well as the sojourn in the open air, are advisable, but should never be carried to the point of actual fatigue. The diet should be regulated—the meals being frequent, though moderate in quantity, and consisting of nourishing, easily digested food. The coarser vegetables, and all the articles of food which tend to increase the quantity of fecal matter, are to be avoided, the preference being given to animal food.

Regularity in the evacuation of the bowels and bladder should be strictly observed. Sexual intercourse, as a rule, is to be forbidden, although in some women absolute abstinence excites the generative organs more than does the moderate indulgence of the sexual appetite.

Among regular therapeutic measures, repeated *local depletion* occupies the foremost place in the treatment of chronic metritis.

To be sure there are few measures, the success of which de-

pends so much on the manner of their employment as is the case with this operation.

In the first place, I would call particular attention to the fact that where the object is simply to deplete, *scarifications* or *punctures of the vaginal portion of the mucous membrane of the cervix* should always be preferred to leeches, as a means of abstracting blood. I consider it very important to repeat the depletion frequently, but to remove only a very small quantity of blood at a time, which may readily be done by scarification, but not so easily and surely by leeches. The latter, besides, possess the following disadvantages: On the one hand, it has always appeared to me that the suction of the animal exerts an irritation, by means of which an increased amount of blood is drawn to the organ which it is our desire to deplete. Further, it is never possible to estimate accurately the quantity of blood to be abstracted by a certain number of leeches, because even a single bite may be followed by severe secondary hemorrhage. The pain of the leech-bite is frequently considerable, and violent uterine colic (not to mention the disagreeable urticaria observed by Scanzoni) may occur, even though the leeches do not crawl into the uterus.

According to my experience, the scarifications possess none of these disadvantages. If the first incisions be superficial, and deeper ones be made only when the former do not yield sufficient blood, the amount of blood to be abstracted may be pretty accurately estimated. Secondary hemorrhage of any importance does not occur. The incision or puncture is frequently not felt at all; in some cases only does the patient experience a slight momentary pain.

Scarification never gives rise to irritation, with subsequent hyperæmia; indeed, if the swollen follicles be punctured at the same time—a point to which we shall allude farther on—an exciting cause of inflammation will also be removed.

As has already been mentioned, a great deal depends on the manner in which the scarifications are made.

If the unfortunate patient is alarmed and horrified days before by repeated reference to the necessity of an “operation,” viz., the incision of the diseased mucous membrane, if a great display of instruments is made while preparing to perform the

scarification, the fear will do her more harm than the slight local depletion will benefit her. I always make the scarifications, without preparing the patient for them in any way whatever, almost without her knowledge, and thus avoid all the fear and excitement which anæmic persons are liable to experience at the mere idea of the abstraction of blood. I also remove but very little blood at one sitting, frequently only half a tablespoonful, and increase the quantity to about one ounce only in plethoric patients with large hyperæmic uteri; but I repeat the depletion frequently, sometimes every third or fourth day, and believe—since after every depletion the quantity of blood previously present is to a certain extent restored—that these same local abstractions of small quantities of blood frequently repeated are far more successful than a single more abundant depletion.

If there are acute exacerbations, or if the symptoms are aggravated at the menstrual epoch, I prefer to make the depletion at those times. Shortly before the expected appearance of the menses, the scarification is particularly beneficial. The dysmenorrhœa usually present is alleviated or disappears entirely, and the hemorrhage is much diminished, especially in cases of menorrhagia; the total amount of blood discharged during the catamenia and abstracted by scarification often being much smaller than was ordinarily lost at each menstrual period. The presence of chlorosis or anæmia is hardly to be considered a contra-indication, for even such patients can readily spare half a tablespoonful of blood.

The scarifications are best made with long-handled knives, specially constructed for the purpose, one of which should be convex, for incising the mucous membrane, and one pointed, for making punctures and tapping the follicles. In Fig. 47 are represented the useful scarificators devised by C. Mayer, with-

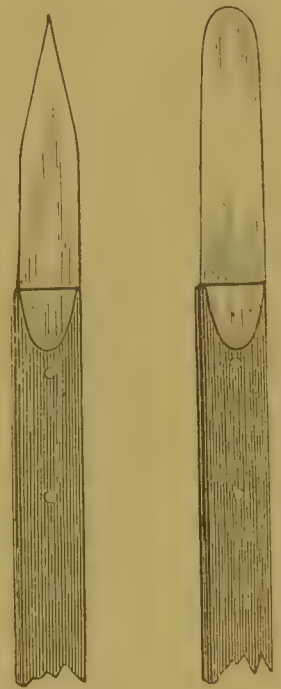


FIG. 47.
Scarificators of C. Mayer.

out the long handles. The operation itself is exceedingly simple. The best plan is to bring the cervix into view in a milk-colored glass speculum, and to incise the mucous membrane to an extent proportionate to the degree of hyperæmia of the uterus and to the quantity of blood to be abstracted. If swollen follicles are visible, they are to be punctured, and the inflammatory irritation thus reduced in two ways: by evacuating the contents of the follicle, and by the accompanying hemorrhage. Even though no follicles be visible, the clear secretion flowing from the puncture will frequently show us that an enlarged follicle lying under the mucous membrane has been opened.

The incisions or punctures should be allowed to bleed into the speculum for a short time; the blood is then poured out, and the speculum removed without making any further application to the cervix. I particularly desire to warn against the practice of injecting cold water against the cervix, because the irritation of the cold fluid, although producing a momentary contraction of the vessels, is rapidly followed by their relaxation and increased plethora, and the result of the depletion is thus completely defeated.

I have never felt the need of scarificators for the mucous membrane of the body of the uterus, such as have been recommended by various American gynecologists (Miller,¹ Storer and Pinkham,² Codman and Shurtleff).³

The beneficial influence of these small, frequently repeated, local depletions is self-evident. The uterus diminishes in size, its sensitiveness decreases, and the alleviation of the symptoms, particularly of the sensation of burning in the abdomen, is perceptible after each scarification. I have already mentioned the beneficial effects on menorrhagia. The excessive mucous secretion also frequently diminishes to a great extent in cases where it has not yet become chronic.

The antiphlogistic remedy second in importance, cold, is far less frequently applicable, because it is very difficult to keep it permanently in contact with the morbid uterus, and its tempo-

¹ Boston Med. and Surg. Jour., March, 1867, p. 133.

² Boston Gyn. J., Vol. I., p. 85.

³ E. I., Vol. III., p. 6.

rary application does not produce an antiphlogistic effect, but, owing to the subsequent reaction, rather the reverse.

An uncomplicated chronic metritis will scarcely ever call for the application of ice to the abdomen. If the swollen uterus be exceedingly painful, however, and the peritoneum on the point of participating in the inflammation, an ice-bag will be found very serviceable. The use of the cold douche to the cervix should be very carefully watched. In the cases of more recent date, as well as during the exacerbations, it should be discarded altogether, because there is no doubt in my mind that its action is that of a decided irritant. If it be used, however, the patient should gradually be accustomed to the low temperature of the fluid to be injected, and a weak stream of water only should be thrown against the cervix from the irrigator.

Of very great importance in chronic metritis is the regular evacuation of the bladder and rectum. The former object is easily attained, the latter only with more or less difficulty, especially as we are obliged to deprive our patients of the injurious drastic cathartics to which they have become accustomed. If we can succeed in regulating the bowels by simple dietetic measures, we will obtain the most satisfactory results. A draught of cold water before breakfast, and the use of raw fruit or preserves (cranberries, prunes), will prove serviceable only in the milder cases. It is important that a regular, determined effort be made at a certain hour of each day, say after breakfast, to evacuate the bowels. Obstinate cases, however, will yield only to more effective means, and we may consider ourselves fortunate if the milder purgatives, castor-oil, salts, and the preparations of rhubarb and senna, produce regular defecation. Should all these measures prove ineffectual, on account of the torpid condition of the intestinal canal and the sluggish performance of the processes of nutrition, mere local therapeutical agents are no longer available, and a methodical system of treatment should be inaugurated and carried out, the object of which should be to increase the activity of the intestine, invigorate the whole nervous system by means of irritants to the skin, and improve nutrition and general tissue-metamorphosis.

A course of treatment of this kind may be carried out at

home, the patient using cold ablutions and general frictions with cold water in the morning, and taking regular doses of mineral waters—above all, that of Friedrichshall and of the Hunyadi-Janos Spring in Ofen, Hungary—and, finally, a walk before breakfast.

If the circumstances of the patients will permit, it is advisable, during the summer season, to send them to some watering-place, or to one of the water-cure establishments, where a rational and systematic course of treatment will materially improve the nutrition of the entire body.

It is particularly in chronic metritis, with its tedious course, often extending over a series of years, that a change like this will be found beneficial.

These summer trips to watering-places are assuming greater importance every year, and the correct and judicious choice of a spring is without doubt very material to the welfare of the patient, and may save the physician many subsequent reproaches. For these reasons I consider it of sufficient practical importance to refer at least briefly to the indications which should guide the physician in sending patients to the principal medical springs. As regards the waters which are used as a beverage, patients with quite recent and not very marked chronic metritis, who are not anæmic and whose intestinal functions are in good order, but who suffer from severe leucorrhœa, should be sent, above all, to the Fürstenbrunnen, Kränchen, Kesselbrunnen, Augusta-quelle, and Victoria-quelle of Ems (the new Bade-quelle, the Buben-quelle, and the Wilhelms-quelle are used principally for baths and injections); next, to Neuenahr, Tönnisstein, and, outside of Germany, to Vichy.

If the patients are well nourished but flabby, and their metritis is of the most chronic form, associated with circulatory disturbance and venous plethora of the abdominal organs and torpid digestion, they should be advised to drink the waters of the Kreuzbrunnen and Ferdinandsbrunnen in Marienbad, or of the Rakoczy and Pandur springs in Kissingen. Soden in the Taunus Mountains, the saline springs of Elster, Franzensbad and Pyrmont, Karlsbad, Tarasp, Homburg, and Wiesbaden are other resorts of the same character.

If the patients are chlorotic, or have become anæmic from metrorrhagia, or if their nutrition has suffered in any way, except in consequence of grave gastric or intestinal catarrh, it is best to send them to the chalybeate springs, where, besides taking the stimulating carbonic-acid chalybeate baths, they will be able to drink the ferruginous water. As transitional forms between the alkaline-saline waters and those containing chloride of sodium with traces of iron, to which latter category belong Marienbad, Homburg, and Kissingen, may be mentioned Franzensbad, Elster, Rippoldsau, and the Ambrosius and Caroline springs at Marienbad. Pure chalybeate waters are found at Schwalbach, Pyrmont, Steben, Driburg, Bocklet, Brückenau, Liebenau, Alexisbad, Cudova and Reinerz, St. Moritz, and Spa.

Of equal importance with the internal use of these waters is the employment of medicated and mineral baths. The brine-baths and the carbonic-acid baths concern us chiefly in this connection. Like the chalybeate baths, they are probably beneficial only by means of their stimulating influence on the cutaneous nerves; and this effect is followed by a general stimulation of the nervous system, with a consequent increased activity of tissue-metamorphosis, not only progressive, but particularly and chiefly retrogressive.

The cold brine-baths, which may also be artificially heated, are especially to be recommended for flabby, scrofulous women, whose uteri are large and thick, but only slightly sensitive, and in whom the disease has become so chronic as not to be marked by acute exacerbations. Of the pure brine-baths the choice lies between Reichenhall, Ischl, Kösen, Pyrmont, Wittekind, Cannstadt, Kolberg, Elmen, Kreuth, and Bex; but those containing iodine and bromine should usually be preferred, and here we should mention first of all Kreuznach, with its old and well-established reputation, also the neighboring Münster on the Stein, the Adelheid spring and Krankenheil near Tölz, Soden-thal near Aschaffenburg, Dürkheim, Sulza, Hall in Upper Austria, and Saxon-les-bains.

The *mud-baths*, which are now found nearly everywhere, are probably to be used under these same indications; they have not yet, however, been sufficiently tested.

The carbonic-acid baths are also particularly effective, such as the thermal brine-baths, especially Rheme and Nauheim, also Kissingen, where the baths contain a very large amount of carbonic acid, and are taken at quite a low temperature; the Sool-sprudel, at Soden in the Tannus, should also be mentioned here. Then come the chalybeate baths, which act solely by the carbonic acid which they contain, and of which we have already enumerated the most important. Although they lose a considerable portion of their carbonic acid on being heated, they still possess more of that agent than the thermal brine-baths of Rheme and Nauheim.

There are now also strong carbonic-acid baths at Homburg, which are fed by the Ludwigsquelle.

Sea-bathing produces quite similar effects to those of brine- and carbonic-acid baths, and is therefore likely to be beneficial to women with not too feeble constitutions.

Between the brine-baths and the indifferent (non-saline) thermal springs come the chloride of sodium thermal waters, distinguished by the small amount of salt which they contain, and by their high temperature; such, for example, are those found at Wiesbaden, Baden-Baden, and Bourbonne-les-bains.

The indifferent thermal waters, especially the tepid ones (28–32° C., = 83–90° Fahr.), like those of Schlangenbad and Landeck, possess an extraordinary quieting power, and are therefore most likely to benefit debilitated women with increased nervous irritability. They are also well borne in cases of marked local hyperæsthesia.

It will often be found exceedingly beneficial not to limit ourselves to either the internal or the external administration of mineral waters alone, but to combine both in a manner suited to each individual case. Thus the patient may drink the salt spring water in Franzensbad and Elster, the Kreuz or Ferdinand Spring in Marienbad, and at the same time take chalybeate or mud-baths; in Pymont, the salt spring may be used internally, and brine or chalybeate baths externally; in Kissingen, we may order Rakoczy or Pandur, together with brine-baths.

While bathing in the springs at one place, the waters of other places may be used as an internal remedy; thus the patient may,

for instance, while in Schlangenbad or Kissingen, drink the chalybeate waters of Schwalbach or Pyrmont, etc.

In conclusion, we would again call special attention to the fact, that however valuable the use of mineral waters may be, they will never supply the place of local treatment, especially in the more recent cases and during the acute exacerbations, which, indeed, may be easily aggravated by their use.

In general, then, it may be said that a sojourn at a mineral or thermal spring is beneficial only in old cases and during the period following local treatment; under these circumstances, however, it often works wonders, partly through the drinking of the waters, and partly by bathing in them; not a little of the benefit, too, is to be attributed to a rational diet and to the change of surroundings.

The baths noted for their stimulating action on the skin (brine and chalybeate baths) are particularly efficacious in chronic metritis, because they give new vigor to the whole process of tissue-metamorphosis, and, by modifying the circulation, tend to bring about the resolution and absorption of old inflammatory hypertrophies of the uterus.

This result is unquestionable, and acquires so much the more value because it cannot be accomplished in the same degree by other, particularly not by local, methods of treatment.

The internal administration of iodine, however useful it may be in perimetritic exudations, is scarcely of more value in causing the absorption of the neoplastic tissue in a uterus that has been inflamed for a long time, than the still much used mustard plasters and blisters, with which the skin is tortured.

A not ineffective, but at the same time not innocuous agent, is the *douche*. The greater the difference of temperature in either direction, and the stronger the stream of water, the greater will be the irritation caused by the *douche*; a strong stream of hot or cold water will, therefore, frequently be very effective in diminishing the size of the uterus, but will also carry with it the danger of inducing a fresh exacerbation of the old inflammatory condition. At all events, it will be well—as experience teaches us that hot or cold injections are borne very differently by different women—to begin nearly at blood-heat, and lower or raise the

temperature gradually, stopping the injections altogether when they are not well borne.

If only a weak stream of water is to be injected, the plain irrigator is superior to any other contrivance; a more powerful stream is thrown by Mayer's "clysopompe."

Injections of tepid water (at a temperature of 88–95° Fahr.), when they are applied without force, so as merely to bathe the cervix, do not irritate, but actually soothe and relax the tissues, and are therefore, with proper care, useful even in recent cases.

The same may be said of *sitz-baths*, which, when hot, cause an increased flow of blood to the pelvic organs, and may thus stimulate absorption, but may also start a fresh inflammatory action.

The so-called *Priessnitz' compresses* deserve particular mention for their stimulating influence on the absorbent vessels, and are also highly beneficial by reason of their quieting and pain-allaying qualities. The manner in which they should be applied is as follows: A thick-folded towel, dipped in cold water and wrung out so as not to drip, is placed on the skin of the abdomen and completely covered, to the utter exclusion of air, by a piece of flannel or oil-silk. The heat of the body soon warms the wet cloth, which, evaporation being prevented, retains its moisture for a long time, and constitutes a permanent moist and warm compress.

Many gynecologists highly recommend the local application of iodine. Scanzoni¹ introduces small sponges dipped in a solution of one drachm of iodide of potassium in one ounce of glycerine, and leaves them in contact with the cervix over night. Thomas² employs the iodized cotton described by Greenhalgh, which is prepared by soaking eight ounces of cotton-batting in the following mixture and carefully drying it: Iodide of potassium, two ounces; iodine, one ounce; glycerine, eight ounces. A tampon of cotton so prepared is introduced into the vagina.

It can scarcely be disputed that the general health is benefited by the iodine contained in the baths of Kreuznach—those to which mother-lye or brine of different strengths has been added

¹ L. c., p. 308.

² Diseases of Women, 3d ed., p. 299.

—and other springs (containing also bromine), but it is a question whether it exerts any influence upon the chronic infarction.

An operation of great benefit, particularly in cases in which the thick hypertrophic cervix projects far down into the vagina, is the amputation of the intravaginal portion,¹ by means of which the enlarged uterus is not only shortened to the extent of the piece removed, but its entire hypertrophic parenchyma, as has been demonstrated microscopically by C. Braun,² is subjected to a process of involution similar to that occurring after delivery, the result of which is a decided reduction in size of the organ. This operation possesses the additional advantage of acting as an efficient hæmostatic in those cases in which profuse, often almost uncontrollable, hemorrhages occur from the inflamed and hypertrophic mucous membrane.

If the uterus is situated low down in the pelvis, or if it is easily displaced by traction, so as to bring the portion to be removed in front of the vulva, the operation may be performed with the knife or scissors, and the edges of the wound united by sutures in the manner described by us when speaking of the amputation of the hypertrophic intravaginal portion. It is not advisable, however, to use too strong traction, because the inflammation may be increased thereby, or may spread to the peritoneum, and also because the anterior vaginal insertion may be divided in such a manner as to form an actual cavity on one side of the uterus, between it and the bladder. If proper care is used, it is not likely that the incision will involve the bladder itself, or Douglas's cul-de-sac. To avoid this accident, however, it is well, before making traction, to mark the point of insertion of the vagina by the introduction of needles or by superficial incisions.

A case in which the vaginal cul-de-sac was opened, and a positive cavity formed, was observed by Simon,³ and I have myself met with a similar experience. In a

¹ *C. Mayer*, M. f. Geb., B. 11, p. 163. *Simon*, M. f. Geb., B. 13, p. 419. *Spiegelberg*, M. f. Geb., B. 34, p. 393, and *Arch. f. Gyn.* V., p. 411. *Hegar*, E. 1., p. 394. *Tagebl. der Wiesbadener Naturf.-Vers.*, p. 176; and *Hüffel*, *Anat. und op. Beh. d. Gebärm. und Scheidenvorfälle*. Freiburg, 1873, p. 44.

² *Zeitschr. d. Ges. d. Wiener Aerzte*, 1864, p. 43.

³ *L. c.*, p. 423.

woman who had borne eight children, and miscarried twice, I amputated the thick, long, unusually hard and nodular cervix, on account of profuse hemorrhages. I did so by seizing the cervix with a loop of cord and Muzeux' double tenaculum, and drawing it down until the intravaginal portion could be reached and removed in the vaginal entrance. On examination immediately after the amputation, the finger passed into a cavity of such size in front of and to the right of the uterus, that I was first inclined to think that I had opened the bladder. The introduction of the catheter into the bladder showed me, however, that the instrument was separated everywhere from the finger in the cavity, although only by the thin vesical mucous membrane. In consequence of the increased inversion of the vagina, produced by the traction downwards, the intravaginal portion had evidently been divided too high up on the right anterior aspect, and the subperitoneal vesico-uterine space had been opened.

After the incision the peritoneum and bladder had retreated upwards, and the uterus being still held down, an actual cavity had developed between the peritoneum, bladder, and uterus. With the exception of an attack of secondary hemorrhage, which was arrested only by the energetic application of the actual cautery, the patient recovered without an untoward symptom. The wound healed perfectly, the hemorrhage and other discomforts ceased, and a year and a quarter later the patient again became pregnant.

Since the production of an artificial prolapsus is not quite devoid of danger, it is usually advisable to operate without changing the position of the uterus. The amputation of the non-prolapsed cervix with the scissors or knife, and the subsequent use of sutures, will be found so laborious—not to mention the considerable loss of blood which always attends the operation—that other methods will usually be preferred.

The chain *écraseur* should never be employed, because it cuts through the mucous membrane of the cervical canal only after it has passed through the firm tissue of the cervix itself. Owing to this circumstance, the mucous membrane is not divided smoothly, and is often drawn into the canula of the *écraseur*: large pieces of the adjoining mucous membrane may thus be removed, and dangerous injuries of adjacent parts produced.¹ The introduction of protective needles, besides being difficult of execution, does not entirely guard against an accident.

Much less dangerous is the wire *écraseur* of Maisonneuve

¹ *Langenbeck*, M. f. Geb., B. 11, p. 169; and B. 18, p. 17. *Breslau*, *Bair. ärztl. Int.-Bl.*, 1858, No. 3. *Sims*, *Loc. cit.*, p. 201. *Weinberg (Martin)*, *Ueber Prolapsus uteri*. *Diss. inaug.* Berlin, 1869, p. 14.

(see Fig. 48). The case of perforation of the bladder and Douglas's cul-de-sac, reported by Meadows,¹ which was probably due to the faulty application of the wire at the very outset, can scarcely be attributed to this instrument. Neither should I like to condemn it on account of a perforation of Douglas's pouch, which I was so unfortunate as to make, because the case was one of cancer, which had spread to the posterior vaginal wall. (The perforation closed spontaneously, but death took place on the tenth day, from secondary hemorrhage from the stump.) Still, care is essential even with this instrument.

The galvanic cautery, urgently recommended by Spiegelberg, is less dangerous. The ease with which the wire can be applied will be greater in proportion to the depth (distance from orifice) of the place where the cervix is to be amputated. The division of the tissues should be accomplished with red heat only, that is to say, as slowly as possible, in order to avoid the risk of hemorrhage. Late secondary hemorrhage during the separation of the eschar appears to be no very rare occurrence; constriction and atresia of the cervix may also ensue.

The difficulty of guarding against hemorrhage is a matter not to be overlooked. It is best prevented after the cutting operation by applying deep sutures. As a rule, the hemorrhage is also easily arrested by the actual cautery, although in some cases even this may prove ineffectual for a time; but in my experience, if care is taken to have the bleeding surface fully exposed, and the cautery iron applied again and again (in certain cases as often as twenty or thirty times), as long as a drop of blood exudes, its hæmostatic effect is perfectly certain. The same can scarcely be said of the

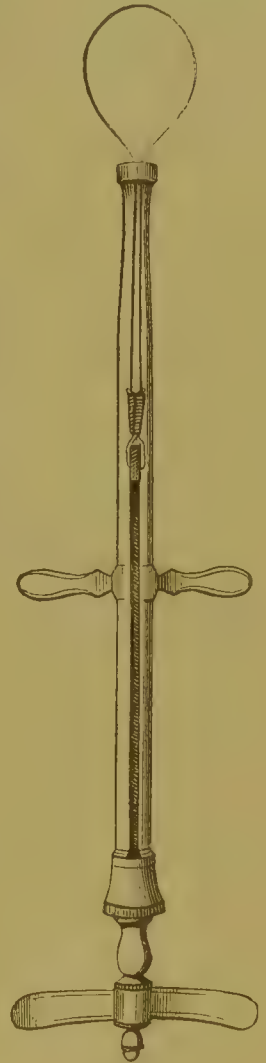


FIG. 48.
Wire écraseur.

¹ London Obst. Trans., XI., p. 102.

tampon. A simple linen tampon is by no means a preventive, and even the *tamponnement* with cotton soaked in perchloride of iron is not absolutely safe, and is, besides, followed by the unpleasant result that the astringent constricts the vagina and renders the canal difficult of access, thus rendering it difficult, in case of necessity, to apply the actual cautery.

For the treatment of the complications, especially endometritis and peritonitis, we refer to the respective chapters on these subjects.

INFLAMMATION OF THE MUCOUS MEMBRANE.

Acute Endometritis.

Klob, Path. Anat. d. weibl. Sexualorg., p. 212.—*Hennig*, Katarrh d. inneren weibl. Geschlechtsorg., 2 Aufl.

Etiology.

Acute endometritis, if we exclude from consideration under this head the certainly closely allied changes immediately following childbirth, is not a disease of frequent occurrence, and is never met with before puberty. It is most apt to occur during the menstrual period, and is generally brought on by some exposure. The suppression of the flow, so often observed, is to be regarded rather as the first symptom than as the cause of the disease. It may further be caused by any severe general irritation of the genital organs (excessive coitus), but especially by irritation of the mucous membrane of the uterus (injections, strong cauterizations, and mechanical injuries). Acute endometritis may occur, too, in the course of infectious diseases, such as typhus and typhoid fevers, cholera, measles, scarlet fever, variola, and also in cases of phosphorus poisoning.¹

Pathological Anatomy.

The mucous membrane shows the well-known changes of acute catarrh. It is hyperæmic and swelled, with a velvety surface, and is so soft that on the cadaver it can oftentimes be

¹ *Hausmann*, Berl. Beitr. z. Geb. u. Gyn., B. I., p. 265.

easily scraped off with the handle of the scalpel. Sometimes small hemorrhagic infarctions are found in the mucous membrane. The pathological change is generally greater in the mucous membrane of the body of the uterus than in that of the cervix.

The condition of the vaginal portion is very like that of the beginning of pregnancy ; it is swelled and soft, there are often erosions on its surface, and the os is rounded. The ciliary epithelium soon disappears, the secretion of the diseased mucous membrane increases, that of the body of the uterus supplies at first a thin watery serum, which soon becomes thickened with cast-off epithelial cells (now and then we find a cast of one of the glands, the contents having come away unbroken), and later by an abundance of pus cells, so that it finally becomes whitish and opaque, or purulent in character. The secretion of the cervix, which is normally quite gelatinous, thick, and ropy, becomes thinner and turbid. The vitreous contents of the swollen follicles, too, become whitish, turbid, and at times purulent.

In more severe cases the parenchyma of the uterus readily becomes involved in the inflammatory process, so that metritis, and even perimetritis, may be added to the original disease. The inflammation may also extend from the uterine to the vaginal mucous membrane, though the reverse is more common, especially in gonorrhœa.

Symptoms.

The disease is accompanied by fever, and may begin with a chill. The fever, however, is usually not high, and lasts but a few days. In uncomplicated cases, abdominal pain may be entirely absent ; still, as a rule, there is a feeling of pressure and weight in the pelvis, and, under some circumstances, a deep-seated pain. The uterus is either not at all, or very little enlarged, and but slightly tender on pressure. The introduction of the sound is, however, painful, and in passing the internal os, or when it touches the fundus, the instrument may cause severe pain.

The vaginal portion is reddened, often bluish, with erosions, or, not infrequently, ulcerations here and there on its surface,

while the follicles are swollen and filled with whitish or purulent contents.

The characteristic symptom is the at first clear, but later, whitish or yellowish discharge, which the speculum shows to come from the uterus. Neighboring organs are not affected in uncomplicated cases further than that there is a frequent desire to pass water.

Prognosis.

The fever and abdominal tenderness last but a few days, the discharge continues a short time longer, and recovery follows. But very often, especially when the treatment is not judicious, a chronic inflammation and discharge will remain.

In cases of gonorrhœal origin the colpitis is often so severe that the uterine disease becomes of secondary importance.

If the inflammatory process is communicated to the peritoneum, by way of uterine substance or Fallopian mucous membrane, the disease may become dangerous to life.

Diagnosis.

If the above-named symptoms are present ; if, with some fever and a copious watery discharge, the uterus is but little swollen and slightly sensitive ; if the visible mucous membrane of the cervix shows the above described changes, the diagnosis is sufficiently assured without trying the sensitiveness of the uterine mucous membrane with the sound, which it is better to avoid if possible.

Treatment.

Usually there is no need of any special treatment. Indeed, we must emphatically advise against the use of different local applications in acute endometritis. Our advice may be limited to rest in the horizontal position, interdiction of coitus, and care for gentle action of the bowels. If the amount of urine is small, and the desire to micturate frequent, soda-water may be given. Severe pelvic pain may be relieved by the Priessnitz

compress. Local blood-letting is advisable only when the uterus is much swollen and very sensitive. The local application of astringents, which is to be avoided in recent catarrh, is advisable if the acute inflammation threatens to become chronic.

Chronic Endometritis.—Catarrh of the Uterus.

Blatin, Du catarrhe ut. ou des fleurs blanches. Paris, 1801; and *Blatin et Nivet*, Traité des mal. des femmes, etc. Paris, 1842.—*Bureau*, Essai sur la leucorrhée. Paris, 1834.—*Jewell*, Pract. Observ. on Fluor Albus. London, 1832.—*Marc d'Espine*, Arch. gén. de méd., 1836, T. X.—*Durand-Fardell*, Journ. des conaiss. méd. chir., Juli-Sept., 1840.—*Robert*, Des affections gran. ulc., etc. Paris. 1848.—*Kauffmann*, Verh. d. Ges. f. Geb. in Berl. 1852, B. V., p. 26.—*Tyler Smith*, The Path. and Treatment of Leucorrhœa. London, 1855.—*Hennig*, Der Katarrh d. inneren weibl. Geschlechtsth. 2 Aufl.—*O. von Grünewaldt*, Petersb. med. Z., B. IX., p. 185.—*Hildebrandt*, Volkmann's Samml. klin. Vortr. Leipzig, 1872, No. 32.

The name leucorrhœa (fluor albus, weisser Fluss, fleurs blanches, whites) used formerly to be employed symptomatically, merely to designate any discharge from the genital organs which was unmixed with blood; no attempt being made to distinguish more nearly the place of its origin. For the most part it was tacitly or expressly taken for granted that it came from the vagina. The French alone, especially Gardien and Capuron, used the word in the sense of blennorrhœa of the uterus.

Now that it has been decided, with a considerable degree of unanimity, that vaginal catarrh, existing by itself, is of comparatively rare occurrence, the question is much discussed as to which of the two is the more frequent, catarrh of the mucous membrane of the corpus, or that of the cervix uteri. Aran, West, and others maintain that catarrh is much oftener met with in the body of the organ, while others still consider it very rare. In my opinion the affection is more frequently confined to the cervix, and the combination of the two forms is quite frequent, while catarrh of the body alone is very rare. When the two forms are combined, the disease of the body is the more important, and we shall therefore speak first of the cases in which its lining membrane seems to be affected, leaving for the next chapter the consideration of the disease as confined to the neck.

Catarrh of the whole Mucous Membrane.*Etiology.*

Catarrh of the uterus is now and then a sequel of acute endometritis, but occurs much oftener independently of it. Not unfrequently an excessive amount of secretion comes on gradually in weak, scrofulous, or chlorotic women, especially in moist and cold tracts of country, like Holland, Belgium, and some parts of England, and, on the other hand, in hot climates. A chronic discharge from the uterus, after confinement, more commonly occurs in women who do not nurse, though it is by no means confined to them. Such a discharge is usually more profuse when portions of the secundines have remained adherent to the placental site. Under the head of causes, too, must rank all those conditions which are calculated to produce any fluxion towards, or a stasis of blood in, the uterus, conditions to which we have referred in detail, under the head of chronic metritis. The increased serous exudation normally preceding and following menstruation is also of importance, since, in scrofulous and chlorotic women, this watery discharge is apt to last longer and longer, till finally it continues through the whole intermenstrual period. Finally, as with catarrh of other mucous membranes, we must recognize cold as a probably frequent cause.

Pathological Anatomy.

In cases of short duration the mucous membrane is hypertrophied, more or less exuberant, and in quite fresh cases, hyperæmic, soft, and succulent. Pigment spots of a dark red, brownish or blackish color, resulting from extravasations of blood, are found in the tissue. It is only quite at the beginning of the disease that the mucous membrane is found reddened; later it becomes of a more slate-gray color. The inner surface, that is, the surface facing the cavity of the uterus, is, for the most part, smooth, in places bossed, and the gland openings are plainly visible.

In other cases we find regular granulations, the outer layers

of the mucous membrane are thrown off, and the deeper layers sprout up irregularly. These granulations may form villous or polypous masses. The French in particular attach great importance to the fungous growths of the uterine mucous membrane;¹ but they certainly include under this head conditions which cannot be classed together, such as villous growths of the mucous membrane,² placental polypus, and sarcoma.

The secretion of the diseased mucous membrane is generally quite clear, its consistency thin, and reaction alkaline. Sometimes it is brownish, rarely bloody, exceptionally, too, is thickly mixed with mucus or pus corpuscles.

In catarrh of long duration the mucous membrane undergoes important changes. The ciliary epithelium is very soon destroyed; later the cylinder epithelium is exfoliated, and replaced by low, polymorphous cells, more like pavement epithelium. At the same time the whole membrane becomes thin and atrophied, till finally the uterine cavity is lined merely by a layer of connective tissue. The glands either fall out, so that with the simultaneous dilatation of the cavity little holes are found, which give the membrane a reticulated appearance, or they are closed in and form, later, little cysts, which, bursting, may leave shallow excavations scattered over the surface. Chronic metritis often complicates the disease. In other cases the parenchyma is notably loose in texture.

Symptoms.

Since in endometritis of the body the cervix is also involved, we shall find with it the most important symptoms of cervical catarrh. Merely indicating this complication we will confine ourselves here to a consideration of the symptoms peculiar to the catarrh of the cavity of the body.

First among the symptoms is the watery discharge which gives the disease its popular name, and which, though in some cases moderately great, is not rarely so profuse as to amount

¹ *Rouyer*, Des fongos. utér. Thèse. Paris, 1858, and *Goldschmidt*, Des fongos. de la cavité de l'utérus. Thèse. Strasbourg, 1859.

² Called by *Slavjansky* (Archiv. de Physiol., II. Série, 1874, p. 53) "Internal Villous Metritis."

to a copious blennorrhœa. As sequels of the profuse secretion, and sometimes when the discharge is in small amount, follow derangements of digestion and loss of appetite, with consequent decline in flesh and strength.

In elderly women, with narrowed os internum, the blennorrhagic secretion may collect in the uterus till forced out from time to time by its contractions, as previously noticed ; if the closure is complete, hydrometra results.

When the disease, as so frequently happens, is complicated with metritis, the bimanual examination is often painful. When endometritis exists alone, the organ is usually tender only upon use of the sound, which, when it passes the internal os or touches the fundus, may cause considerable pain.

Manifold disorders of menstruation may result from uterine catarrh. Hemorrhages are very common, occurring either independently of the catamenia (metrorrhagia), or as profuse menstruation (menorrhagia). They are more likely to be profuse, and may even endanger life, when the mucous membrane is in a granulating condition.

Dysmenorrhœal disturbances, too, are not rare, being most apt to occur when the swelling of the cervical mucous membrane has narrowed the channel of exit for the discharge.

Amenorrhœa, which may be one of the first symptoms in the acute disease, always appears at a later stage in the chronic form, resulting, as it does, from the atrophy or destruction of the mucous membrane.

Later in the disease we may have all the derangements previously mentioned under the head of chronic metritis, such as dyspepsia, headache, and symptoms referable to the nervous system, especially the protean forms of hysteria. For details of this part of the subject, consult von Grönewaldt.¹

Experience shows sterility to be a frequent sequel of chronic catarrh, which is readily explained in the early part of the disease by the swollen condition of the mucous membrane, extending perhaps from the os externum to the abdominal opening of the Fallopian tubes, and hindering the passage of either sperma-

¹ Peters. med. Zeitschr., B. 9, p. 190, etc.

tozoa or ova. Later, we find an explanation of the sterility in the size of the uterine cavity and the smoothness of its walls, which afford no halting-place for the ovum. We will here merely call attention to the importance of these conditions in the causation of placenta prævia. Instead of escaping altogether, the ovum is now and then, if not comparatively often, stopped at the inner os, and leads to placenta prævia.

Routh¹ emphasizes the importance of circumscribed catarrh of the fundus. He distinguishes, in a most scientific way, four different forms, the first of which is accompanied by cramps, catalepsy, and mental derangement. According to him, the tenderness may be so great as to afford an explanation of Gooch's "irritable uterus."

The course of the disease is as chronic as infarction of the uterus. If the patient remains without treatment, a well-established blennorrhœa will not improve until the uterus has become atrophied, its walls thin and flabby, and the mucous membrane destroyed, when it will die away of itself.

Diagnosis.

If, upon examination with the speculum, we find the cervix but slightly diseased, and at the same time a copious watery discharge from the os, then the whole lining membrane of the uterus is diseased. Whether the parts principally affected can be distinguished by their sensitiveness to the touch of the sound seems to us doubtful.

Prognosis.

Though uterine catarrh does not immediately endanger life, the loss incurred through hemorrhage and serous discharge may have a most pernicious influence upon the general health. Cases do occur, however, in which a moderately large discharge continues a long time without injury.

Treatment.

Kammerer, Amer. Jour. Obstet., II., p. 185.—*Riegel*, Deutsches Archiv f. Klin. Med., V., p. 464.—*Spiegelberg*, Volkmann's Samml. klin. Vortr., 1871, No. 24.

¹ London Obstet. Trans., Vol. XII., p. 136.

The great importance of prophylaxis must be mentioned in this place, though it is unnecessary to discuss it in detail, since it follows as a matter of course from the etiology. The value of constitutional treatment cannot be over-estimated, since it is often possible to cause the disease to disappear without local treatment, especially in cases where the catarrh is the result of chlorosis, scrofulosis, anæmia, or insufficient nourishment.

A proper mode of life, in accordance with hygienic rules, nourishing, easily digested food, wine and iron, will often produce extraordinary results. Baths, whether cold, sponge, sea, chalybeate, or salt spring, act favorably by their influence upon the general health.

Internal medication is in general without influence upon the local process. Cathartics have no power to lessen the discharge, though they may be of use indirectly by relieving the costiveness which is so uniformly present, and which causes engorgement of the uterus. The drastic purges should not be used, but castor-oil or some of the salines will often induce a decided improvement.

Most of the baths recommended in the treatment of chronic metritis act probably in the same way. Among them, Ems and Neuenahr are specially popular, perhaps on account of their excellent action in catarrh of other mucous membranes. It is a question how far the uterine mucous membrane is influenced by the local use of the douches (*Bubenquelle* in Ems) and suppositories (*Badespecula*) of the watering-places.

We come now to an unsettled but practically very important point. It is not easy to treat locally the main seat of the disease, the mucous membrane of the body of the uterus, and the attempt will be attended by a not inconsiderable degree of danger to the patient, so that the question becomes a very justifiable one, as to how far a local treatment of the easily accessible vaginal and cervical mucous membranes may be successful in influencing the disease proper. It certainly seems imperative, in consideration of the danger attending all intra-uterine medication, to try first the effect of general treatment and of local applications to the adjacent cervical mucous membrane. We have already

called attention to the importance of the former, and will now consider the value of the latter.

In the first stage of the disease, that of hyperæmia and swelling of the mucous membrane, mere scarification of the vaginal portion may avail to end the whole process, and, even in more chronic cases, the local treatment of the cervical mucous membrane, hereafter to be described, will often be successful in entirely removing, or at least favorably modifying, the disease existing higher up. In obstinate cases, however, in which there is pressing need of interference, we have only the directly local treatment left. Such urgent indication may be afforded by the blennorrhœa or metrorrhagia from a granular mucous membrane. In the first case, injections into the cavity of the uterus afford by far the most efficacious mode of treatment. In the second, however, the less dangerous sponge-tent is enough. The point of the sponge extends into the cavity, and, as it swells, it destroys the granulations by pressure, so that the effect of a single tent is often quite remarkable. At all events, it is certainly advisable to make trial of the tent before having recourse to a scraping of the mucous surface with the Récamier curette or Simon's sharp scoops, whereby the danger of the treatment would be much increased.¹

The forms of local treatment, when the blennorrhœa is profuse, are most varied. The *crayons* recommended by Becquerel and Rodier were at one time very popular. They were made up with tragacanth, and served to bring the remedy—usually tannin in equal parts with the gum—in direct contact with the diseased surface. Nitrate of silver has enjoyed even greater popularity. The silver is combined with nitrate of potash, to make it less friable, and if the uterus is not flexed, or the cervix too narrow, a stick of the caustic is easily passed into the cavity of the uterus. It is recommended by many² to break off the stick, and leave a piece in the cavity. It is immediately covered with albuminates, to be sure, and made innocuous, though at the same time inert. Furthermore, if the unprotected stick is used, its introduction so excites the cervix and os internum to contrac-

¹ Chamberlain, Noeggerath, et al., Amer. Jour. of Obst., Vol. IV., pp. 719, 726, 728.

² Courty, Malad. de l'utérus, 2d éd., pp. 291 and 699.

tion, that not only is the operation made difficult or impossible, but the crayon becomes so covered by albuminates that the idea of its exerting any caustic action after the cavity is reached is illusory. For this reason various instruments have been contrived for keeping the stick covered till it reaches its destination. Spiegelberg¹ uses an instrument like a uterine sound, hollowed to receive a crayon and a wire to thrust it out. Martin² invented a similar instrument, familiarly called the uterine pistol, which he uses for the introduction of any desired remedy into the cavity of the uterus. He has a mass made from glycerine and various powders, of consistency firm enough to allow of its being shaped into little crayons, the active constituents being chloride of iron, sulphate of copper, oxide of zinc, or tannin.³ Storer, of Boston,⁴ uses a like instrument. But the same objection applies to this method as to the use of nitrate of silver; namely, the crayons are rendered inactive by becoming covered with albuminates, they work unequally upon the uterine surface, and, moreover, as foreign bodies they cause irritation. It is a better way to introduce the remedies in the form of easily soluble ointments, which may be made up with lard or glycerine, and introduced by means of an instrument similar to the one described above, carrying a perforated receptacle, the contents of which may be forced out with a piston.⁵

There is still another method, introduced apparently by Miller, and afterwards strongly recommended by Playfair.⁶ A bit of cotton is wrapped about the end of a common sound, dipped in the remedy, and introduced into the uterine cavity. By wrapping it loosely or tightly, it is possible to leave the cotton or withdraw it as desired. But this, too, is unsatisfactory, for either the application is wiped off in passing the cervix, or gets so coated with mucus as to prevent any action on the diseased parts.

¹ L. c., p. 228.

² Berl. Beitr. z. Geb. u. Gyn., B. I., H. 1, p. 28.

³ The following is the formula: Take a grain and a half each of chloride of iron or oxide of zinc, and of powdered marshmallow root, and add enough glycerine to make into a crayon.

⁴ Boston Gyn. Jour., Vol. VII., p. 94.

⁵ Barnes' Ointment Positor. See Diseases of Women. London, 1873. p. 138.

⁶ Brit. Med. Jour., Dec. 11, 1869, and Lancet, 1870, II., July 1.

The surest means we have of producing a uniform effect upon the uterine mucous membrane is the *intra-uterine injection of fluids*. Such injections were used long ago by Lisfranc and Vidal de Cassis, and their employment is now becoming more and more general. The method, though efficient, is not without danger, and must therefore be employed with great caution. The instrument for making the injection is a small syringe, with a nozzle shaped like the uterine sound. C. Braun's¹ pattern is an excellent one. The syringe is carefully filled, so as to contain no air, the nozzle introduced, and as much fluid injected as is thought proper.

A series of published, and probably a much larger one of unpublished cases, show that the operation may produce dangerous symptoms, and even cause death. The bad results may follow: *first*, from the passage of the injected fluid into the peritoneal cavity, but, although careful experiments have shown the possibility of this, it is surely of very rare occurrence, and is indeed possible only under certain conditions. For instance, the fluid must be injected with considerable force, while at the same time its return to the vagina is prevented either by a narrow cervix, a flexion, or, what oftener happens, by the active contraction of the cervix about the nozzle of the syringe; and even under these circumstances it is not probable that a sufficient quantity will enter the tube except when it is abnormally dilated at its uterine extremity.

A great number of experiments have been made for the purpose of determining the possibility or impossibility of the passage of fluid through the Fallopian tubes. Vidal² was the first to institute experiments upon the cadaver. He found that with moderate pressure the fluid entered neither tubes nor veins. Hennig³ reached the same conclusion. Klemm⁴ also found that it was only with great difficulty that the fluid could be made to pass the Fallopian tubes, but that it entered the veins of the uterus and broad ligaments somewhat more



FIG. 49.
Braun's syringe
for intra-uterine injections.

¹ *Fürst*, Monatschr. f. Geburtsh., B. 26, p. 1.

² *Essais sur un traitement*, etc. Paris, 1840.

³ *Katarrh der inneren weibl. Geschlechtstheile*. Leipzig, 1862, p. 12.

⁴ *Ueber die Gefahren der Uterin-Injection*. Diss. Inaug. Leipzig, 1863.

easily. If the cervix was ligatured it required no very high pressure to drive the fluid through the tubes.

These experiments on the cadaver admit, of course, of qualified conclusions only in regard to the living body. A number of cases, however, confirmed by autopsy, prove conclusively that such passage of fluid is possible. Von Haselberg,¹ for instance, reports a case with autopsy, in which a solution of chloride of iron had penetrated to the external end of the right tube. In this case the uterus was anteflexed, and the tube so dilated as to allow the passage of a large sound through its whole length. Barnes² saw a case in which the same fluid had passed the distended left tube. Another case is reported by Kern.³ Cohnstein⁴ has written a historical account of intra-uterine injections. This author, making the mistake of supposing the word uterus to have had the same signification with the ancients as with us, ascribes to them the use of intra-uterine injections; whereas, as is commonly known, they included under this term both vagina and uterus.⁵

Secondly, evil results may be caused without the entrance of fluid into the tubes, by a too forcible dilatation of the uterus, causing a metritis which may extend to the peritoneum. On account of these dangers, resulting chiefly from the lack of a free exit for the fluid, it is necessary to observe the following cautions:

1. Favorable cases must be selected, and those especially avoided which are complicated with any inflammation of the uterus itself or its appendages. There must be no tenderness in or about the uterus. Old adhesions remaining after inflammatory processes are very undesirable, though not an absolute contra-indication.

2. There must be a free exit for the injected fluid. This may be obtained by using a nozzle with double canal, but a coagulum may easily stop the current, and hence it is better in every case first to dilate the cervix with a sponge-tent.

3. Only a small quantity of fluid must be injected.

4. The fluid should be slightly warmed, and slowly injected.

If these precautions are strictly observed, we shall avoid with certainty all alarming accidents, as well as the uterine colic, so

¹ Monatschr. f. Geburtsh., B. 34, p. 162.

² Obstet. Operations, 2d ed., p. 468.

³ Würtemb. med. Correspondenzbl., 1870, No. 7.

⁴ Beitr. z. Therap. d. chron. Metritis. Berl., 1868.

⁵ See the criticism by Freund, Deutsche Klinik, 1869, pp. 229, 239, 325.

often caused by contraction of the organ upon its abnormal contents.

Where there is a flexion of the uterus, which will reappear upon withdrawal of the syringe, it is advisable to follow the advice of Haselberg,¹ and draw the fluid back into the syringe at the end of a minute or two. Hildebrandt² thinks this procedure dispenses with the necessity of artificial dilatation of the cervix.

A large number of different fluids are used for these injections, but usually it is either tincture of iodine, or a solution of chloride of iron, acetate of lead, nitrate of silver, carbolic acid, alum, or tannin. Experiments have been made by Nott³ to determine the action of these agents upon albumen. According to him, alum and iodine have the advantage of forming no precipitate of albuminates, while all the others must form coagula in the uterus, which cannot come away through a small canula. The stronger agents, as concentrated solutions of nitrate of silver or chloride of iron, have, however, the advantage of destroying any exuberant growth of the mucous membrane.

The most energetic local application is the galvano-cautery, as recommended by Spiegelberg.⁴ A porcelain tip is introduced cold, and then brought to a red heat. Spiegelberg considers it to be entirely free from danger.

ENDOMETRITIS CERVICIS, CATARRH OF THE CERVIX.—ECTROPION OF THE OS UTERI.—ENLARGED FOLLICLES.—OVULA NABOTHI.

Wagner, Archiv f. phys. Heilk., 1856, p. 493—*C. Mayer*, Ueber Erosionen, etc., p. 22.—*Hildebrandt*, Volkmann's Samml. klin. Vortr. Leipzig, 1872, No. 32.

Etiology.

The causes of cervical catarrh are much the same as those of chronic inflammation of the mucous membrane of the body of the uterus, though this tract, or rather the neighboring mucous membrane of the vaginal portion, pathological processes of which

¹ L. c.

² L. c.

³ Am. Jour. of Obst., Vol. III., p. 36.

⁴ Monatschr. f. Geburtsh., B. 34, p. 393, and l. c., p. 231.

readily extend into the cervix, is much oftener exposed to mechanical violence. As the uterus from time to time changes position, the vaginal portion is rubbed against the walls of the vagina, and besides this it is exposed to injury from various external sources, such as coitus, onanism, and various therapeutic measures.

Pathological Anatomy.

The mucous membrane of the cervix, especially its longitudinal folds (plicæ palmatæ) is looser in texture than normal, somewhat œdematous, and in the early stages hyperæmic. The mucous membrane of the vaginal portion is also swollen, and usually infiltrated and hard, but seldom œdematous. The secretion from the cervix is, as usual, thick, stringy, and tenacious, but its quantity may be much increased. With a longer duration of the disease, the connective tissue of the hyperæmic, copiously secreting mucous membrane becomes much hypertrophied. It may increase to such an extent as to overfill the canal, and protrude from the external os, forming the condition called by Tyler Smith¹ "inversion of the canal of the cervix uteri," and by Roser² "ectropion of the os," in analogy with ectropion of the conjunctiva. This hyperæmic, easily bleeding mucous membrane, even in its natural state more red than the vagina, readily gives the impression of an erosion. The hypertrophied mucous membrane, besides protruding from the os, forms longitudinal folds within the canal. If the disease is confined to one lip, the swelled membrane, instead of protruding from the os, forms a tumor presenting at the orifice and differing in appearance from a polypus only in having a broad base instead of a pedicle. A further peculiar complication is the condition of the glands, which, in catarrh of the cervix, are regularly met with on the external surface of the vaginal portion—the assertion of Friedländer and Lott, that they are abnormal in this position, to the contrary, notwithstanding. These glands become of importance through the retention of their secretion, which takes place

¹ Pathology and Treatment of Leucorrhœa, p. 84.

² Archiv d. Heilkunde, 1861, p. 97.

in catarrh. Their openings become closed by the swelling of the mucous membrane, and finally the edges of the orifice unite completely; the inflammatory changes still go on within the closed follicle, as well as outside; it fills with secretion and exfoliated epithelium, and a small cyst is formed. If the disease advances to suppuration, pus also is found in the cyst, the contents of which may remain purulent long after disappearance of the suppurative catarrh. Usually, however, the secretion is clear, thick, and glassy, though the abundance of exfoliated epithelium often gives it a cloudy or milky white appearance. Under the microscope the secretion shows ciliary epithelium, disintegrated cells, free nuclei, colloid and mucus corpuscles. These cysts tend to perpetuate the catarrh, through the irritation which they cause. Their appearance varies much with their location, whether within or without the canal. Within the canal, where the mucous membrane is but loosely connected with the muscular layer, the swelling follicle easily forces it up, forming an elevation on the surface which rises higher and higher, while the rapidly proliferating cells of the connective tissue close in below it, till finally the grayish-white cyst hangs like a little polypus on the surface of the mucous membrane. They form thus in large numbers within the cervix, presenting an appearance so characteristic that they have been known from ancient times as *ovula Nabothi*.

Their appearance is quite different when they occur on the external surface of the vaginal portion; there the mucous membrane is so closely adherent to the tissues beneath that the swelling follicle is unable to raise it much, and cannot therefore become pedunculate, but appears merely as a translucent grayish cyst, lying under the mucous membrane, and perhaps elevating it slightly. They are recognized more easily when the contents become purulent, by their yellowish color. These follicular swellings run a very different course in different cases. If they are not too abundant, and the catarrh begins to improve, the secretion becomes thickened and they diminish in size. We find, then, numerous little yellow protuberances, which when pricked discharge a thick, comedo-like mass. The thickening of the contents may advance still further, till at last we find, scattered over

the mucous membrane, only small points the size of a millet seed, the contents of which have become so firmly adherent that they can no longer be removed.

If, on the other hand, the inflammation is more severe, and the follicles very abundant, these minute cysts furnish an additional source of irritation to the mucous membrane, which becomes very hyperæmic, filled with large, distended blood-vessels, and increases to such an extent as to cause a considerable hyperplasia of the whole vaginal portion; the thickly scattered, hard, swollen follicles are then seen resting upon an inflamed, reddened surface. The lips of the os become very much everted, giving the opening a thick, trumpet shape. The hyperplasia of the mucous membrane may be so great, and the part rendered so hard by the swollen follicles and inflammatory exudation, that the disease may be mistaken for carcinoma. Virchow calls the disease *acne hyperplastica*, and compares it to a toper's nose.

The swollen follicles may burst, and so give rise to a follicular ulceration. If several follicles, lying close together, distend a flaccid mucous membrane to a considerable degree, the result is seldom, as we shall see later, a follicular hypertrophy of one lip (see p. 149), but far oftener a mucous polypus of the cervix (see p. 145).

Symptoms.

Here also the most constant symptom is leucorrhœa, which may be followed by the same results as in catarrh of the corpus. If the hyperæmia is considerable, and the pressure of the follicles upon the surrounding tissues great, there results in many cases an almost unbearable sense of burning in the pelvis. The inevitable pain in the back, too, will not be absent. Menstruation may be normal; the discharge, however, is often increased in amount.

The extensive swelling of the mucous membrane in ectropion of the os may cause not only a copious watery discharge, but hemorrhage so serious as to produce a high degree of anæmia.

Sterility is not uncommon, caused in part by the swelling, in part by the profuse discharge, which washes away the spermatozoa.

Upon examination, the body of the uterus may be found

quite normal, the cervix, however, thickened and often tender. The speculum shows the different appearances, as above described, of simple catarrh, ectropion, and swollen follicles. Moreover, the vaginal portion is often the seat of erosions and ulcers,—conditions which we shall consider in another place.

The course of cervical catarrh is very chronic. The discharge may continue many years, and the swollen follicles may long remain unchanged.

Diagnosis.

Catarrh of the cervix may be recognized, upon digital examination, by the swelling and infiltration of the vaginal portion, and, upon inspection through the speculum, by its characteristic appearances.

Prognosis.

Once firmly established, the disease, if left to itself, remains for a long time unchanged, or grows gradually worse, for the swollen follicles are a continual source of irritation; while, on the other hand, the irritated membrane continually causes new follicles to undergo cystic degeneration. Proper treatment, however, will generally produce, if not a complete cure, at least a nearly complete disappearance of the symptoms.

Treatment.

The same therapeutic means that are used in treating catarrh of the corpus, may be employed in treating that of the cervix uteri. At the head of the list stand nitrate of silver and carbolic acid. Here, however, the application of remedies is a much simpler affair. If it is desired to make the application only to the mucous membrane of the vaginal portion and the opening of the cervical canal, the solution may simply be poured into a porcelain speculum, or it may be applied with a brush. Medicated crayons, or those of silver nitrate, can be brought in contact with the disease without difficulty. The sound, wrapped in cotton and dipped in the remedy, is also a ready means of making an application.

Should the mucous membrane of the cervical canal be much

swollen and covered with cysts or granulations, it is best to use the sponge-tent; it crushes the exuberant growths and acts favorably upon any hemorrhage, as well as upon the blennorrhœa. The sponge may be used as a means of making a local application, as well as mechanically. 'Thomas' suggests two methods of preparing the sponge: either to fill the hole left by the wire with a preparation of cacao butter and the drug to be employed, or to dip the sponge, before being pressed, into a solution containing the remedy, dry it, and then prepare it in the usual manner.

Since the swollen follicles continually irritate the diseased mucous membrane, it becomes an urgent indication to empty them. This may be done through a speculum with a long-handled, sharp-pointed scalpel. The pressure of the swollen tissue and adjacent follicles is so great that the thick contents will usually be discharged spontaneously; if not, they may be emptied with the handle of the scalpel. If the woman lies upon the back, the follicles farthest back should be pricked first, so that the blood, which always escapes from the inflamed mucous membrane, may not conceal the field of operation. All the follicles to be found may be operated on at once, but the process will have to be repeated with a new crop, which will develop from the deeper part of the membrane. If ovula Nabothi exist in the cervical canal, where it is hard to get at them with a scalpel, they may be destroyed with solid nitrate of silver or by a sponge-tent.

The emptying of the distended follicles has an extraordinarily beneficial effect upon the irritated state of the uterus, an effect which may be explained on the one hand by the diminution of pressure upon the neighboring parts, and on the other by the local abstraction of blood. After a few faithful repetitions of the operation, the swelling and inflammation, and gradually the discharge itself, will be found to have diminished so considerably that the application of astringents and caustics becomes unnecessary.

The treatment becomes more difficult in those cases where there is marked hyperplastic swelling of the mucous membrane

¹ Diseases of Women, 3d ed. Phila., 1872, p. 251.

with extensive ectropion. In milder cases of this sort, crude acetic acid works well, merely poured into the speculum and allowed to remain five minutes or so in contact with the diseased part. In severe cases larger or smaller pieces of the membrane may be excised, or it may be treated with a strong caustic, as chromic acid or chloride of iron. The latter is specially to be recommended where hemorrhage is a troublesome symptom.

In very old cases it is better to make a thorough application of the actual cautery to the whole everted portion of mucous membrane.

These are very satisfactory cases to treat, for the most obstinate hemorrhage, supposed perhaps to be due to cancer, may often be completely cured by a short course of treatment.

If the hypertrophied cervix extends far down into the vagina, it is frequently better to amputate in the same way as in chronic metritis.

Mucous polypi and follicular hypertrophy of one lip of the os tinæ are pathologically closely allied to the catarrhal and hyperplastic conditions of the cervical mucous membrane. In both, the transformation of the follicles into cysts is the primary change, and both show to a certain extent merely more advanced stages of the follicular changes occurring in catarrh.

We shall consider these two conditions separately, since they differ so much in the way in which the tumor is formed.

MUCOUS POLYPI.

Nivet et Blatin, Archives gén., Octobre, 1838.—*Oldham*, Guy's Hosp. Rep., April, 1844.—*Huguier*, Soc. de Chirurgie. Paris, Mai, 1847.—*Billroth*, Ueber den Bau der Schleimpolypen. Berlin, 1855.—*Hirsch*, Histologie und Form der Uteruspolypen. Diss. Inaug. Giessen, 1855.—*Wagner*, Archiv f. phys. Heilk., 1855, p. 289.—*C. Mayer*, Vortr. über Erosionen, Excor., etc. Berlin, 1861.—*Klob*, Pathol. Anat. d. weibl. Sex. Wien, 1864, p. 133.—*J. M. Duncan*, Edin. Med. Jour., July, 1871, p. 1.

Etiology.

We have already seen how, in catarrh of the cervix, the swelling follicles easily raise the mucous membrane, lying loosely

over them, and form small elevations upon the surface, the bases of which become gradually smaller, till finally the little cyst remains connected with the mucous membrane by only a slender pedicle. Such a swollen follicle—an ovulum Nabothi—is in reality a miniature mucous polypus, though not generally bearing the name. But mucous polypi, properly so called, are formed by an exaggeration of the same process, so that an important part in the etiology of mucous polypi is played by chronic catarrh and its sequels of cystic degeneration of the follicles and alteration in the tissue of the mucous membrane, making it flaccid and more easily movable upon the parts beneath.

Pathological Anatomy.

Mucous polypi are made up of single follicles, or of several lying close together, which elevate the loose-textured mucous



FIG. 50.

Mucous polypus of the cervix, the size of a walnut.

membrane covering them; and the process goes on till the final result is a polypus-like projection of the mucous membrane, whose club-shaped extremity, made up of one or several follicles, hangs towards the external os, while a slender pedicle of mucous membrane connects it above. The polypus descends gradually by force of its own weight and the pressure of the uterine walls, till it protrudes from the external os. The follicles may pass through the changes already described under chronic inflammation. The contents may become thickened and the follicle scarcely perceptible; oftentimes

the follicle splits open, the walls collapse, and a shallow depression is formed, which gradually disappears.

The parenchyma of the polypus is made up of a finely fibrous

connective tissue with numerous nuclei. The membrane covering it is very vascular, its large supply of blood giving it oftentimes a cherry-red color, and it bleeds most readily. These polypi have their origin for the most part in the canal of the cervix; still they are by no means rarely derived from the mucous membrane of the corpus, beginning probably in the uterine glands. Such, however, as have their origin here usually remain small, never reaching the cervical canal, so that they are not often discovered. It is very common to find them in autopsies, especially of elderly women who have borne many children. If such a polypus has its seat in one of the lateral furrows of the cavity, it will be found flattened antero-posteriorly.

The cervical polypi, as above mentioned, quickly appear at the external os. Their size is usually between that of a pea and that of a hazel-nut, very rarely reaching the dimensions of a pigeon's egg. They are very variable, too, in aspect and consistency, according to the different conditions of the follicles, and according as the connective tissue is succulent and soft, or more fibrous and hard. If the polypus is made up of a number of follicles, individual ones may separate to form secondary polypi upon the main mass. Furthermore, the mucous membrane covering the tumor¹ may take on an exuberant villous growth, and we have then a papilloma with dendritic outgrowths. (This papillary growth may possibly originate, as in follicular hypertrophy of a single lip, from the inner wall of the ruptured follicle.)

Symptoms.

The small polypi of the uterine cavity usually produce no symptoms at all.

Cervical polypi, however, always cause more or less hemorrhage, the blood coming from the hyperæmic and varicose vessels of the surface of the growth, and the bleeding being sometimes very profuse. It often takes first the form of copious menstruation, to result later in irregular metrorrhagia. Leucorrhœa is present between the hemorrhages, and is, as the etiology of the disease would indicate, frequently of earlier date than the poly-

¹ *Klob*, Pathol. Anat. d. weibl. Sexualorg. Wien, 1864, p. 139.

pus. Cervical polypi, as well as those of the cavity, when of large size, are always accompanied by sacral pain.

They often cause sterility, partly by the mechanical obstacle which they present, partly by the constant serous or bloody discharge which attends them.

Diagnosis.

As soon as the polypus appears at the external os, the diagnosis is easy. On digital examination a small, soft tumor is felt in the os, which, seen through the speculum, appears as a blood-red or more bluish mass, with the smooth exterior of the normal, though perhaps very hyperæmic mucous membrane, beneath which the yellowish or grayish follicles are often plainly to be seen. There is usually no difficulty in excluding fibrous polypi, for they are as good as never seen of such size in the external os, and, when the mucous polypus is unusually large, its consistence will always serve easily to distinguish it from the hard, fibrous polypus.

Circumscribed swelling and granulation of the cervical mucous membrane, as it appears in chronic catarrh and diphtheritic inflammation, may much resemble a tumor lying in the external os, but the finger will easily decide between the broad swelling and the polypoid tumor.

The question between polypus and an early abortion may be a difficult one to decide.

The ovum presenting itself at the mouth of the uterus may closely resemble the ulcerated end of a polypus, and the history of the case may offer no solution of the difficulty. The hesitation, however, regarding the diagnosis, can be but temporary.

Small polypi of the cervix, without symptoms, are of course not apt to be discovered. If urgent symptoms of concealed disease be present, the os must be dilated with a sponge-tent, and a digital examination of the cavity made.

Prognosis.

Mucous polypi may become troublesome on account of long-continued leucorrhœal and bloody discharge. Apart from hem-

orrhages, however, they are seldom the cause of serious danger, the disease naturally tending to amelioration; for, as soon as the tumor has been fairly extruded from the os, the symptoms become less severe, and the polypus may even drop off spontaneously.

Treatment.

The only indication is, of course, removal by operation, which may be done in different ways.

If the polypus is very small and soft, the best way is to seize it with long forceps, close to its insertion, and twist it off.

If we prefer to cut the pedicle, which, as it causes less injury to the mucous membrane, it is better to do where the polypus is large and its pedicle slender, the whole may be drawn down into a speculum by a small hook, and cut off with long scissors. Any after-treatment of the pedicle, such as cauterization, is entirely unnecessary, for there is no danger of severe hemorrhage or of a return of the affection in the same place. A second polypus may appear after the removal of a first, but it was probably present before, and merely hindered in its descent by the presence of the one operated upon.

Polypi lying higher in the canal, and therefore difficult of access, may easily be gotten rid of by means of the sponge-tent. It is harder to come at those in the cavity of the uterus itself, but after dilatation of the os they can often be broken up by the finger, or twisted off with forceps. Smaller-sized polypi may be destroyed by means of caustic injections.

The removal of these polypi is a most satisfactory operation, removing, as it does, so easily and entirely, symptoms so annoying, and perhaps even dangerous.

FOLLICULAR HYPERTROPHY OF THE LIPS OF THE OS UTERI.

Virchow, V.'s Archiv, 1854, B. 7, p. 164, und Die krankhaften Geschwülste, B. III., 1, p. 142.—*Lebert*, Traité d'anat. pathol., T. I., pl. XL., p. 15.—*Cruveilhier*, Atlas d'anat. pathol., Livr. 39, pl. 3, figs. 2 et. 2'.—*Wagner*, Archiv f. phys. Heilk., 1856, p. 509.—*Simon*, Mon. f. Geb., B. 23, p. 241.—*Höning*, Berl. kl. W., 1869, No. 6.—*Ackermann*, Virchow's Archiv, B. 43, p. 88.—*Martin*, Berl. Beitr. z. Geb. u. Gyn., B. II., p. 51.

Etiology.

Follicular hypertrophy, which consists in an exuberant growth of the mucous membrane, with cystic degeneration and, later, rupture of the follicles, is undoubtedly closely connected etiologically with mucous polypi. Just as in the latter disease a closed and swollen follicle of the cervical mucous membrane irritates, by its increasing weight, the surrounding tissue to rapid growth, and eventually protrudes in the form of a polypus, so also in follicular hypertrophy is transformation of the follicles into cysts the first step, and the different form of the tumor results from the fact merely that in this disease the end of the lip grows broad.

The mucous membrane covering the outer surface of the vaginal portion is much more firmly attached to the underlying structures than that of the canal, and opposes much stronger resistance to the pressure of the swelling follicles, and this is probably the reason that a comparison is so seldom drawn between follicular hypertrophy and mucous polypus. Two conditions seem to me specially to favor the production of follicular hypertrophy: first, when the cervical mucous membrane, in women who have borne many children, is so everted by ectropion of the os that the end of the lip is no longer a part covered with closely adherent mucous membrane, but with that which originally lined the cervical canal, and which, as we know, is more inclined to hypertrophic growth; secondly, when the cervical canal, in women who have never borne children, is so narrow that it cannot accommodate a polypoid growth within it; the proliferating mucous membrane is thus forced to grow downward and to protrude from the cervical canal as an extension of one of the lips.

Pathological Anatomy.

These tumors are specially interesting from the numerous forms under which they appear. From already published cases, and from one of my own not yet published (see Fig. 51), I have drawn the following description of the disease.

The polypoid extension of one of the lips (one is diseased equally often with the other) presents the appearance of a pedunculate tumor, which Virchow has very aptly compared to an enlarged tonsil. Its parenchyma is made up of a very vascular connective tissue. Throughout the tumor, and even extending into the pedicle, are large, closed, or sometimes ruptured cavities, clothed with cylinder epithelium and filled with mucus. These are the follicles, degenerated into large cysts. The surface of the tumor is composed of well-developed papillæ, covered with a pavement epithelium, which is often quite firm; it is quite irregular, owing to the bursting of the follicles beneath, which causes depressions, shallow or deep, according to the size of the cavities, and when two neighboring cysts burst, a sharp edge or even band of tissue may be left between the hollows made.



FIG. 51.

Follicular hypertrophy of the anterior lip.

Occasionally, as in the case observed by me, and mentioned further on, the walls of the degenerated follicles may become the seat of rich fungous growths, which, as in the case reported by Ackermann, may become so large as to burst through the cyst, appearing here and there upon the outside of the tumor as cauliflower excrescences. (These primarily pure glandular growths with secondary fungous additions—as in ovarian cystomata—must not be confounded with papillomata of the vaginal portion of the os in which cystic degeneration has afterwards taken place.)

The appearance of the tumor becomes much changed if it advances so far as to project from the vulva. At first this exposure is only temporary and occasional, but finally becomes permanent. Then all the follicles break, and the cavities (*Krypten*) become shallower, giving the surface a broken, scarred appear-

ance. The epithelium grows thicker and thicker, so that a firm tumor covered with epidermis is formed, which may be composed (as indeed it may be in earlier stages) of several lobes. These changes were most prominent in the case reported by Simon, in which there was a complication with true hypertrophy of the vaginal portion, though this was secondary, and caused probably by the dragging of the tumor.

Symptoms.

First among the symptoms of hypertrophy of one lip are leucorrhœa and hemorrhage. When the mass reaches the vulva, we may expect most troublesome dragging and bearing-down pains, resembling even those of labor, and finally, added to all this, the patient will have the annoyance and pain which the presence of a foreign body between the labia necessarily causes.

Diagnosis.

This form of tumor is unlikely to be confounded with any other, as the soft polypoid prolongation of one lip, composed of mucous membrane alone, is quite characteristic.

Treatment.

The removal of the tumor by operation is of course the only resource. This is to be effected at the level of the normal lip, and may be done with scissors or scalpel, but better, on account of the vascularity of the pedicle, by the galvano-caustic wire loop.

Reference has been made to a case of my own (see Fig. 51), which I will report more fully here. The patient was a woman twenty-eight years of age, six weeks married. Two years before, after severe exertion, she felt something come down between the labia of the vulva. Of late it had come down oftener, but had returned spontaneously, mere sitting down being sufficient to effect reduction. She complained of menorrhagia and leucorrhœa. At the entrance to the vagina there was a soft red tumor, hanging by a gradually tapering pedicle to the anterior lip of the os uteri. It was removed by the galvano-cautery. A few days later a small mucous polypus was removed from the cervical canal, and uninterrupted con-

valescence followed. Two years after, she was confined with a stout boy. The tumor measures an inch and three-quarters in breadth, and three-quarters of an inch in thickness, while the pedicle is one-third of an inch thick and three-quarters of an inch broad. Over the surface are numerous fissures and canals, into some of which the sound can be passed quite a distance. At the apex and at one other place little bridges of mucous membrane may be raised from the surface. On section, the apex is found to be filled with a cyst the size of a hazel-nut, with thick walls, and containing a tough, transparent mucus. The walls are thickly studded with a fine papillary growth. There are besides, in both tumor and pedicle, numerous small cavities (Krypten) which also contain papillary growths.

EROSIONS AND ULCERS OF THE VAGINAL PORTION OF THE UTERUS.

Otterburg, Lettres sur les ulcérations de la matrice, etc. Paris, 1839.—*J. H. Bennet*, Pract. Treat. on Inflamm., Ulcerat., and Indur. of the Neck of the Uterus. Lond., 1845.—*Robert*, Des Affect. granul., ulcér., et carcin. du col de l'utérus. Thèse. Paris, 1848.—*E. Wagner*, Arch. f. phys. Heilk., 1856, p. 515.—*C. Mayer*, Vortr. über Eros., Excor. etc. Berlin, 1861.—*Scanzoni*, Chronische Metritis. Wien, 1863, p. 78.

The Simple Erosion.

An erosion is merely a circumscribed loss of the epithelial covering, which may be caused in one of two ways. First, and in the majority of cases, the epithelium is gradually removed by maceration. We then find bright red spots upon the visible part of the vaginal portion (the lower part is often everted), and also upon the opposite vaginal mucous membrane. Their edges may be well defined, or they may pass gradually over into the healthy membrane. They are smooth of surface and bleed readily if rudely touched, as, for instance, with the end of the speculum. The loss of epithelium may be caused, secondly, by an exudation from the papillæ, which raises it first in vesicles from the size of a pin-head to that of a millet-seed, though now and then larger; these vesicles then burst, leaving a spot eroded of epithelium, which increases in size by a repetition of the process in its neighborhood. This form of erosion is called by Scanzoni aphthous; by Lisfranc, Robert, and others, herpetic. Joulin¹ observed vesicles with clear mucous contents, which he called pemphigus.

¹ Gaz. des hôp., 1861, No. 40.

The first sort is usually traumatic in origin, in that the epithelium, loosened by long maceration in the catarrhal secretion, is finally chafed and rubbed off, either by coitus, onanism, pessaries, or even by unusual motions of the uterus itself, as when its weight is abnormally great, or the abdominal pressure increased by excessive exertion. If the discharge is very profuse or irritating in character, it alone may be sufficient to cause erosion.

The aphthous form is the result of endometritis, the papillæ of the mucous membrane secreting so copiously that the epithelium is raised in vesicles. The diagnosis is easily made by the speculum, the erosion being seen simply as a reddened spot, from which the moist, shining, epithelial covering has disappeared. The vesicles are distinguished from swollen follicles by their diminutive size, white color, and distinct elevation above the surface of the mucous membrane.

This insignificant amount of disease produces no symptoms, and needs therefore no treatment.

If the stagnating, irritating discharge be carefully removed by mild injections, the erosions will heal without further interference. If the spots refuse to heal, if there is much serous oozing, or inclination to hemorrhage, they may be carefully touched with a solution of nitrate of silver of medium strength.

The Papillary Erosion.

By the continued action of the traumatic causes already enumerated, the simple erosion may be developed into the papillary ulcer. The papillæ left bare by the removal of the epithelium are continually irritated, and develop into granular, dark-red elevations, which the touch of even a soft brush will cause to bleed. The erosion extends both inwardly and outwardly from the external os. If the amount of irritation be very great, the papillæ take on a further growth, and the fine villi rise above the general surface. Rarely does the process go farther still, and take on the form of a true fungous granulation of the vaginal portion. When it does, the mass now and then becomes so flattened by the vaginal walls as to look something like a cock's comb, and is by English writers called cock's-

comb granulations ; by the French, *ulcérations fongueuses végétales*.

In these villous growths there is great hyperæmia, the vessels lie quite superficially and exposed to injury, so that hemorrhage and all its evil consequences are specially apt to complicate this form. On this account, and because of a certain danger of cancerous degeneration (see carcinoma of the cervix), the prognosis should be guarded.

The diagnosis is easy, the gross appearances of the disease being so characteristic. It must not be confounded with ectropion of the hypertrophied mucous membrane, which, with its numerous folds and dark-red color, resembles it somewhat ; still, the two conditions are not infrequently combined.

The best mode of treatment is to pour crude acetic acid into the speculum, in sufficient quantity to cover the diseased vaginal portion of the cervix ; the acid should be allowed to remain there about five minutes, and the application repeated perhaps every other day. The papillæ become white and withered, while the epithelium is excited to active growth, and even to suppuration. I would particularly caution against the use of the stick of nitrate of silver ; it causes profuse hemorrhage and excites the papillæ to more active growth.

The larger fungous growths may be cauterized with perchloride of iron, or chromic acid applied on a pledget of cotton, or with the hot iron. Growths larger still may be first excised with scissors, and then cauterized in the same way.

Follicular Ulcer.

The distended follicles described on page 141 may burst, especially if their contents are purulent, and, discharging the contained fluid, leave a small cup-shaped ulcer. The follicles themselves have been described under the head of cervical catarrh. The ulcers remaining after their rupture are of no importance whatever, and heal spontaneously, so that the rupture of the follicle must be regarded as a favorable circumstance. Should the base of the ulcer look badly and begin to granulate, it is well to touch it with solid nitrate of silver.

The varicose ulcer described by Scanzoni and other gynecologists is probably either a simple or papillary erosion occurring in connection with varicose superficial veins of the vaginal portion.

We have described these forms of ulcer as occurring independently, but it should be understood that they are very likely to be combined; the simple erosion, particularly, is very apt to take on a papillary character.

The appearance of the ulcers may be much altered by too active treatment; for instance, the frequent touching of a papillary ulcer with solid nitrate of silver will cause an abundant development of flaccid granulations upon an unhealthy base, and the frequent application causes further a chronic irritation of the mucous membrane, characterized by œdema of the submucous tissue, which gives to the finger a peculiar sensation, as if the mucous membrane lay upon a cushion of fluid. If, in such a case, all active treatment be omitted, the œdema will soon disappear, and the ulcer heal spontaneously.

Phagedenic or Corroding Ulcer of the Uterus.

This form of ulcer, first described by Clarke, consists in a gradually progressive disintegration of the normal tissues, and is often, no doubt, confounded with rapidly disintegrating cancer, so that its existence has been denied by many; but that it does occur has been established by the decisive observations of Rokitansky¹ and especially Förster.² It is a deep ulcer with hard edges and villous gangrenous base, uncontrollable in its course, and, so far as past experience shows, necessarily fatal.

The diagnosis can be made only on the dead body, or at best by removal of the disease and examination with the microscope.

For treatment, the actual cautery certainly deserves trial.

Chancre of the Vaginal Portion.

Chancre of the vaginal portion has the usual characteristics of the sore in other parts. It is very rare, and more rarely still does it acquire a phagedenic character.

¹ Handb. d. path. Anat., III., p. 538.

² Handb. d. path. Anat., II., p. 318.

DISPLACEMENTS OF THE UTERUS.

ANTEFLEXION, ANTEVERSION, RETROFLEXION, RETROVERSION.

Schweighäuser, Ueber einige phys. u. prakt. Gegenst. d. Geburtsh. Nürnberg, 1817, p. 251.—*W. J. Schmitt*, Ueber d. Zurückbeugung d. Gebärmutter, etc. Wien, 1820.—*Tiedemann*, Von den Duverney'schen, etc. Heidelb. u. Leipzig, 1840.—*Simpson*, Selected Obstet. Works, I., p. 681.—*Pajot (Velpéau)*, Gaz. des hôp., Juill., 1845, No. 82 et seq.—*Rigby*, Med. Times, Nov., 1845, p. 124 et seq.—*Kiwisch*, Beitr. zur Geburtsk. Würzburg, 1848, II. Abth., p. 134.—Verhandl. der Pariser Akad. d. Med., Gaz. Méd. de Paris, 1849, Nos. 41–47.—*Sommer*, Beitr. z. Lehre v. d. Infarct. u. Flex. d. Gebärm. D. i. Giessen, 1850.—*Mayer*, Verh. d. Berliner Ges. f. Geburtsh., 1851, IV., p. 198.—*Rockwitz*, e. l., V., p. 82, und De Anteflex. et retroflex. Uteri. Marburg. D. i. 1851.—*Scanzoni*, Sc.'s Beiträge, I., p. 40, und II., p. 161.—*Valleix*, Gaz. des hôp., 1851, No. 129; 1852, Nos. 5–123; and l'Union, 1853, No. 106.—*Duncan*, On the Displacements of the Uterus. Edin., 1854.—*Virchow*, Verh. d. Berl. Ges. f. Geb., IV., p. 80; Wiener allg. med. Z., 1859, Nos. 4, 5, 6, 20; und Mon. f. Geb., B. 13, p. 168.—*Rokitansky*, Wiener allg. med. Z., 1859, Nos. 17, 18.—*Arneth*, Petersb. med. Z. 1861, I., 5.—*L. Mayer*, M. f. Geb., B. 21, p. 426.—*Klob*, Path. Anat. d. weibl. Sex. Wien, 1864, p. 56.—*Max Bernh. Freund*, Die Lageentwicklung d. Beckenorgane, etc., in Breslauer Klin. Beitr., 1864, 2 H., p. 85.—*Martin*, Die Neig. u. Beug. d. Gebärm., etc., 2 Aufl. Berl., 1870.—*Süxinger (Seyfert)*, Prager Vierteljahrschr., 1866, IV., p. 44.—*Meadows*, Lancet, 18th and 25th of July, 1868.—*Hueter*, Die Flexionen des Uterus. Leipzig, 1870.—*Credé*, Archiv f. Gyn., 1870, I., p. 84.—*Winkel*, Die Behandl. d. Flex. d. Uterus, etc. Berlin, 1872.—*Hildebrandt*, Volkmann's Samml. klin. Vortr. Leipzig, 1870, No. 5.—*Schroeder*, e. l., 1872, No. 37.—*B. Schultze*, e. l., No. 50; Tagebl. d. Leipziger Naturf.-Vers., 1872, p. 81; und, Archiv f. Gyn., B. IV., p. 373.—*Joseph*, Berl. Beitr. z. Geb. u. Gyn., B. II., p. 107.

History.

It is very remarkable that such common affections as the backward and forward displacements of the uterus should have waited so long for recognition, and it can be accounted for only by the neglect of gynecological examinations. Attention was first called to it by the difficulties attending retroflexion in pregnancy. Before the present century, only very isolated instances of displacements in nulliparæ had been published, and these had either been accidentally discovered on the dead body,

as in the cases reported by Saxtorph¹ and P. Frank,² or had come to the knowledge of the observers through symptoms evidently occasioned by some complication, as in the cases published by Willich,³ Schneider,⁴ and Kirschner.⁵ Schweighäuser was the first who gained any extended experience of the subject; he called attention to the fact that the backward displacements are more common in non-pregnant (thirty-nine cases) than in pregnant (five cases) women. He was supported by W. J. Schmitt, who, at the same time, gave the history of a few cases of anterior displacement, representing it as very rare.

The flexions were generally regarded as much more remarkable and rare, notwithstanding the fact that the cases of Saxtorph and Frank were retroflexions, as ascertained by a post-mortem examination.

A more general knowledge of the frequency of anterior and posterior deviations of the uterus was first attained through the studies of Simpson and Kiwisch, whose investigations were facilitated by the use of the sound; and it is only in the most recent times that we have entered upon a study of the causes of these deviations founded upon the anatomy of the pelvic organs and their physiological variations.

Definition and Etiology.

The anterior and posterior displacements of the uterus are of two sorts. If, with the changed position of the body, the cervix turns in the opposite direction, so that the position of the whole organ is altered, while its form remains normal, the displacement is called *version*; if, however, the cervix retains its normal position in the vagina, at the same time that the body of the uterus falls backward or forward, *i.e.*, if the axes of the two portions form an angle, the displacement is called a *flexion*.

The uterus is normally slightly curved forwards, so that a

¹ Ill. soc. med. Havniensis, 1775, T. II., p. 127.

² 1786, Opusc. posth. Viennæ, 1824, p. 78.

³ Richter's chirurg. Bibl. Göttingen, 1779, B. V., p. 132.

⁴ E. l., 1791, B. XI., p. 310.

⁵ Stark's Archiv. Jena, 1793, B. IV., p. 637.

forward displacement is called anteversion, so long as this curve is not abnormally great, and likewise in pure retroversion there may be a slight (physiological) anteflexion. A displacement forwards, then, is to be called a pure version, even when there is an appreciable angle in the anterior surface line; while, on the other hand, a posterior displacement is designated retroflexion, the moment the body and the neck form any angle at all.

But these malpositions seldom exist uncombined. When the body is displaced, the cervix is generally turned more or less in the opposite direction, and a moderate amount of version exists with the flexion.

As we attach greater importance to the flexions, we shall consider all those displacements as flexions in which the direction of the axes of the two portions of the uterus is not quite normal; and we shall class under versions only those in which the axis of the whole organ remains straight or is but slightly bent forwards.

In order to understand well the way in which these malpositions occur, we must first obtain a clear idea of the normal relations of the uterus.

The uterus lies in the true pelvis, between the bladder and the rectum, as represented in Fig. 52, but is by no means immovably fixed in this position. The fundus has almost entire freedom of motion antero-posteriorly. The round ligaments, taking, as they do, a curved course, and having their insertion in soft parts, allow, even when normally tense, very considerable excursions backward. The cervix is more firmly connected, though it, too, is nowhere immediately joined to immovable parts, being bound to the unstable bladder in front and to the rectum behind. The vagina, furthermore, affords no



FIG. 52.

Normal position of the uterus when the bladder is only partially filled.

firm support, but itself follows the movements of the cervix. Any considerable lateral motion is prevented by the lateral ligaments, but beyond this the uterus has no intimate connections except with the adjoining organs—bladder and rectum,—which vary much in their own position, according to the quantity of their contents. The condition of the bladder, especially, has a decided influence upon the position of the uterus. If it is entirely empty, the uterus tips far forward, as in Fig. 53, and if at the same time the rectum is empty, there will be a large space



FIG. 53.

Position of the uterus when the bladder is entirely empty.



FIG. 54.

Position of the uterus when the bladder is full to distention.

between the two organs to be filled with folds of intestine. As the bladder fills, its posterior wall presses the uterus back toward the rectum, and more or less of the intestine is crowded out of Douglas's space. If the bladder is overfilled, the uterus will be pressed quite back into the hollow of the sacrum and Douglas's space will be quite empty (see Fig. 54).

The condition of the rectum has far less influence upon the position of the uterus, not having an immediate connective-tissue union with it. Douglas's space lies between them, and they are

connected on either side by the recto-uterine ligaments, which are inserted posteriorly not only upon the front of the rectum, but also into the posterior pelvic wall, and which prevent only a very considerable anterior deviation. When the rectum is empty, Douglas's space is filled with folds of intestine, which, as the bowel fills, are gradually pressed upward, without the uterus being much affected, so that it is only when the rectum is excessively distended that the uterus is somewhat anteverted.

The position of the uterus changes, then, decidedly with the varying contents of the bladder; the more nearly empty it is, the more marked are the anteflexion and anteversion of the uterus; and when the bladder is distended, the uterus may be forced into slight retroversion.

If, then, anteflexion is regarded as normal under certain conditions, the question naturally arises whether under any circumstances it should be considered a pathological condition. Schultze answers with an unconditional negative, but, as it seems to us, wrongly; for, as a rule, a high degree of anteflexion causes a series of decidedly pathological symptoms, such as dysmenorrhœa and sterility, and furthermore, there is a great difference between the normal anteflexion, when the bladder is empty, and the pathological displacement. To obtain a clear idea of this, compare Figs. 53 and 55.

Such *anteflexions* as that shown in Fig. 55 are often congenital, as proved by autopsies of the new-born, but we are not justified in calling them physiological on this account. We regard them as a pathological excess of a physiological formation, because, as a rule, they cause symptoms, and often quite serious ones, at the age of puberty.

But anteversion is also met with in women who have borne children. In such cases the uterus is found flaccid, and sharply bent forward; and the bladder, as it fills, merely displaces the whole backward without elevating the fundus.

The deformity may be caused, in a flaccid state of the pelvic organs, by an unusual abdominal pressure. The union between uterus and bladder is not so firm as is usually supposed; the connective tissue may be stretched to such an extent that the fundus finds room to flex itself anteriorly without resting upon

the bladder at all ; and thus, as the bladder distends, the uterus is pushed back bodily, retaining its abnormal shape. The angle of flexion may be so acute that the fundus causes the anterior wall of the vagina to protrude into the vaginal canal.

A high degree of pure *anteversion* is not often met with. It is produced under the conditions mentioned above, when the uterus is abnormally thick and firm, as in recent inflammatory states. In the normal condition of the uterus, however, an increase of abdominal pressure will regularly increase the angle of flexion, so that a pure version is not produced.

An increase of weight within the fundus will produce the same effect as an increase of pressure upon it. A small fibroid in the body of the organ, or a general increase in its size and weight, as in chronic metritis or the puerperal state, will cause the uterus to bend forwards to an abnormal extent, either as a whole (version), when it is abnormally stiff, or in part (flexion), when of normal consistency or flaccid.

A fibroid tumor will drag the uterus forward or backward, according to the changing position of the patient, so that there may be in the same person, at one time, an anterior, at another, a posterior displacement.

As the uterus lies normally somewhat anteverted, a greater pathological importance should be attached to the posterior displacements. In health the uterus becomes somewhat retroverted only during extreme distention of the bladder, a fact of great importance in the etiology of the posterior displacements, for it is easy to understand how the deformity may take place, if once the abdominal pressure becomes applied to the anterior surface of the uterus. Under such circumstances any considerable increase of pressure must tend to depress the fundus still more, and whether this produce version or flexion depends merely upon the condition in which the tissues of the uterus happen to be ; if they are as firm or firmer than ordinary, a version will result, as the normally dense tissue admits of no backward flexion ; if they are relaxed and flaccid, especially at the inner os, there will be a flexion. And, furthermore, according as the conditions vary, so may a version become a flexion, and *vice versa*. The change from flexion to version is, to be sure, more

rare; intercurrent inflammation may, however, cause it, and I have even seen it, as a temporary state of things, during the stiffening of the uterus in menstruation. The position of the uterus in the pelvis, whether high or low, is also important, since, as it sinks lower, the fundus falls more backward (see Fig. 75).

As a rule, retroversion is the first stage, and then, as the tissues become relaxed, the organ bends.

On the other hand, retroflexion may take place suddenly, under a powerful increase of the abdominal pressure (as in coughing, vomiting, falling, etc.), provided the uterus happen to be reclining at the time a little backward. Hildebrandt and Schultze attach great importance to the relaxation of the recto-uterine ligaments; we would consider it, however, not so much an active cause as a favoring circumstance. The very considerable relaxation of these ligaments, so regularly found in cases of retroflexion, is often merely secondary.

It is only in very exceptional cases that a malposition is caused by adhesions of the fundus, either anteriorly or posteriorly; adhesions, it is true, are very commonly found with displacements, but, as a general thing, they are the result of the change in position, the parts having been long in contact and having finally become adherent.

The purely secondary displacements, such as occur, for instance, with large abdominal tumors, which crowd the uterus backwards or forwards, need not be considered in this place.

We shall close the etiology of these deformities with a brief recapitulation of the circumstances under which each displacement occurs.

Anteflexion occurs in nulliparæ as a congenital excess of a physiological state; it also occurs in women who have borne children, when, in a normal or relaxed state of its tissue, the uterus is exposed to any great and repeated increase of the abdominal pressure.

Anteversion takes place, with an abnormally dense and swollen uterus, under the same circumstances which, with a normal or flaccid uterus, would lead to anteflexion.

Retroflexion is rare in nulliparæ, occurring only when, by

reason of long-continued catarrh, the tissues of the uterus have become unnaturally loose. In women who have borne children it is especially apt to occur when the body of the uterus is large and heavy, and the region of the internal os loose in texture; these causes being usually aided in a measure by powerful abdominal pressure acting in conjunction with a distended bladder.

Retroversion would be produced, in nulliparæ and pluriparæ alike, by these same influences acting upon a normal or abnormally firm uterus.

Pathological Anatomy.

The displacements present themselves under the following forms :

In ante flexion (see Fig. 55), body and cervix form an angle which opens forward and is more acute than it normally should be. The cervix retains its position in the vagina, unless, as is



FIG. 55.
Anteflexion of the uterus.



FIG. 56.
Anteversion of the uterus.

frequently the case, a slight coexisting anteversion causes it to point backward. The body lies upon the anterior wall of

the vagina. The angle formed by body and cervix may be very acute.

In *anteversion* (see Fig. 56), the axes of cervix and body may form a very obtuse angle or none at all, so that the greater the displacement the more is the os directed backward.

In *retroflexion* (see Fig. 57), body and cervix form a varying angle which opens backward. If the case be one of pure retroflexion, the cervix maintains its position; usually, however, there is some accompanying retroversion, which gives the os a direction toward the symphysis.

In *retroversion* (see Fig. 58), the os is directed more and more toward the symphysis as the deformity increases, and in its most



FIG. 57.
Retroflexion of the uterus.



FIG. 58.
Retroversion of the uterus.

exaggerated form the uterus may be completely turned over, the os looking directly upward.

In both varieties of version the form of the uterus remains unchanged.

In flexions, the uterus is now and then (in retroflexion) bent into the form of a retort; as a rule, however, the flexion is angu-

lar, and the point of flexion is almost without exception at the internal os. In very rare cases, where the cervix happens to be quite flaccid, the upper portion of it follows the body, the point of flexion then being in the cervix; on the other hand, Klob has reported one case where the angle was in the corpus uteri.

In anteversion and anteflexion the fundus usually finds support upon the bladder, and the amount of displacement is not great; under certain circumstances, already mentioned, however, it may force down the anterior vaginal wall, so that body and neck lie nearly parallel, and the fundus is just inside the vulva. In backward displacements the body sinks, without opposition, deep into Douglas's space, so that these dislocations are usually much more considerable. If the fundus falls very far back, a flexion is almost always the ultimate result.

In none of the displacements does the region of the internal os preserve exactly its normal position. The cervix usually moves somewhat in a direction opposite to that taken by the fundus, and the upper part of the vagina moves with it. At the same time the internal os is often shifted to a somewhat higher position. The versions, whether pure or complicated with flexions, cause thus a flattening of the vaginal cul-de-sac,—either the anterior or the posterior one, as the case may be.

Where there is a high degree of retroflexion, the os uteri becomes slightly patulous, the anterior lip yielding somewhat forward.

Among the sequelæ of these displacements, the most common is inflammation of the parenchyma of the uterus and of the mucous membrane, brought on, especially in retroflexion, by the obstruction to the circulation and resulting hypostasis. Chronic metritis may also be caused, in backward displacements, by the mechanical violence to which the uterus is subjected during the passage of hard masses of fæces through the rectum, while in anteflexion dysmenorrhœa may have a causative relation.

At a later period we may have irritation or inflammation of the uterine peritoneum, which may lead to adhesions (more rarely are the adhesions the cause of the displacement).

After long duration of a flexion, the tissues about the internal

os gradually atrophy, and in old women the mucous membrane may unite across the canal, and stenosis result.

In very rare cases the fundus of the retroflexed uterus may, by pressure, cause gangrene and perforation of the vagina or rectum.¹

Symptoms.

The different displacements have many symptoms in common; still certain ones are so much more prominent in one form than in another, that it will be more satisfactory to consider their respective clinical histories separately.

Anteflexion.

Under the head of etiology we have referred to the difficulty of deciding between a normal and an abnormal amount of anteflexion, and remarked that the decision must depend in great measure upon the symptoms of the case.

Two symptoms are commonly met with in cases of this kind, and will in general lead to the discovery of the disease, namely, dysmenorrhœa and sterility.

The *dysmenorrhœa* is caused by the obstruction existing at the point of flexion; the menstrual flow is unable to escape, the cavity becomes filled with blood, which the uterus seeks to discharge by contraction, the effort causing peculiar colicky pains, like those of labor. The trouble begins with puberty, and, if not interrupted by treatment or pregnancy, may continue through menstrual life. The pain begins before the appearance of any discharge, and usually ends with a copious flow of blood; it may be so severe as to cause convulsions and loss of consciousness. The repeated irritation at each catamenial period may set up a chronic inflammation, which will cause pain between, as well as during, the periods.

Sterility is observed especially often in cases of anteflexion, and yet we have observed a high degree of the deformity in women with whom conception promptly followed marriage.

¹ *Klob*, Pathol. Anat. d. weibl. Sex., p. 69.

Where there is anteflexion, the question is not of the impossibility, but of the difficulty of conception. With the same degree of flexion, conception may in one case readily take place, while in another continued sterility results.

Urinary disorders almost always accompany anteflexion. There is seldom incontinence, but usually a frequent desire to pass water. Pains in the back, loins, and lower extremities,—the usual concomitants of uterine disease—are also complained of.

The clinical history will be more complex if the malposition becomes complicated with metritis, perimetritis, and endometritis, with such symptoms as abdominal pain, fluor albus, and menorrhagia.

Retroflexion.

In retroflexion dysmenorrhœa and sterility are far less frequent, while hemorrhage becomes a more important symptom. The cause of this is probably owing solely to the fact that this malposition occurs, as a general thing, in women who have borne children. In such the cervix and internal os are usually freely passable for the menstrual discharge, and conception also can readily take place. But, on the other hand, the sequelæ of preceding pregnancies often remain in the form of metritis and endometritis. The circulation, already impaired by these morbid conditions, is still further disturbed by the deformity, and the hemorrhages made more and more frequent and profuse. That this is the real cause of the difference in the symptoms between anteflexion and retroflexion, is proved by the fact that anteflexion is far less apt to cause dysmenorrhœa and sterility in women who have borne children, while in the nulliparæ, who sometimes are afflicted with retroflexion, the symptoms are the same as in anteflexion.

There is, however, another symptom of greater diagnostic importance than this, so prominent, indeed, that it may be called the most important symptom of retroflexion, that is, *pain in the lower part of the spine*. It is this symptom and, later, the hemorrhages, which most often induce patients to seek medical advice.

Symptoms of paralysis are very frequent in retroflexion, occurring usually in the lower extremities, but sometimes elsewhere. This symptom may be hysterical; but, apart from this, it may be explained in various ways. In some cases it comes from local pressure upon the motor nerves of the lower extremity. Again, a local neuritis may lead to myelitis, or the paralysis may be simply reflex.¹ Chrobak² reports a case of retroversion where there was decided nervous disturbance of the respiration, which immediately disappeared when the uterus was replaced.

Symptoms connected with the urinary organs may appear as in ante flexion, though as a rule not so frequently. Hildebrandt calls attention to the fact that the retroflexed body of the uterus may compress the ureters so as to cause their distention or even hydronephrosis.

Anteversion.

The clinical history of this disease cannot be given independently, since it is always complicated with metritis. When it exists in any considerable degree, we have pain in the abdomen, hemorrhage, leucorrhœa, disturbances of the urinary apparatus and rectum neuroses and hysteria.

Retroversion.

Retroversion in slight degree and uncomplicated may exist without symptoms. If the uterus tips far back, we have symptoms similar to those of retroflexion; while if inveterate retroversion be complicated with chronic inflammation, the symptoms will be the same as in anteversion.

Diagnosis.

The simple versions are immediately recognized, upon digital examination, by the direction of the vaginal portion,—forward

¹ *Leyden*, Samml. klin. Vortr., 1870, No. 2. *Louis Mayer*, Berl. Beitr. z. Geb. u. Gyn., II., p. 83. *Peter*, Gaz. des hôpit., 1872, Nos. 10-12.

² *Wiener med Presse*, 1869, No. 2.

in retroversion, backward in anteversion. The position of the body of the uterus is determined by the bimanual method of examination.

In flexions the vaginal portion retains approximately its normal position, so that the displacement has to be made out by bimanual examination alone. The diagnosis of ante flexion is made when cervix and corpus form a more acute angle than normal; that of retro flexion, when they form any angle at all (posteriorly).

In ante flexion the fundus is easily felt, and as other tumors are rare in this location, it is not apt to be confounded with anything else.

The diagnosis of retro flexion presents greater difficulties, the fundus in these cases being often not easily accessible to the bimanual method of examination. The discovery of a tumor, resembling the uterus in size and consistency, in the posterior vaginal cul-de-sac, may lead to serious error, even when we are confident that we can feel the angle of flexion, for extra-uterine tumors are not rare in this locality, and may lie so close to the cervix, at the level of the internal os, as to simulate the retro flexed uterus; it therefore becomes necessary to assure ourselves that the corpus uteri is absent from its normal position.

If the bimanual method of examination is attended with unusual difficulty, or if, as in case of exudations surrounding it, the position of the uterus cannot be made out by palpation, recourse must be had to the sound. As a rule, however, it is possible to get along without it, and its use in flexions, where the location of the body of the uterus is unknown, is by no means free from danger.

Prognosis.

Versions and flexions are not in themselves dangerous to life; they may, however, by the complaints which they engender, by the length of time they continue, and by the complications with which they become associated, interfere most seriously with the enjoyment of life, and lead to lasting derangements of health. Intercurrent pregnancy often effects a cure of the ante flexion, or at least of the symptoms which it occasions. Of all

these troubles, retroflexions are the most disagreeable, for, once actually present, they almost never disappear spontaneously, and obstinately defy treatment.

Treatment.

Under this head we must first discuss the preliminary question, whether displacements of the uterus, as such, should receive any treatment at all.

Starting from the undoubted facts that cases are met with in which high degrees of forward displacement exist, without being accompanied by any symptoms of disease, and, furthermore, that other cases of very considerable retroflexion are observed in women who enjoy perfectly good health, many gynecologists have maintained that the displacements forward and backward occasion no symptoms at all, and that the manifestations of disease in such cases are always owing to complications, especially to inflammation of either the mucous membrane or the parenchyma of the uterus. Even if this view be correct, yet it does not follow that it is irrational to treat the abnormal positions as such; for it may most properly be maintained that the displacements easily lead to inflammation of the uterus, and that the natural way to avoid this result is to correct the deviations.

It is then desirable, even from this standpoint, to treat the displacements when existing without symptoms; but, on the other hand, most gynecologists of the present day are convinced that the cases of decided displacement existing without symptoms are very rare exceptions, and that an abnormal position, as a rule, interferes decidedly with health.

The treatment of displacements, as such, is therefore clearly indicated, and may be omitted for exclusive attention to the complications only when success becomes hopeless or can be attained only by means in themselves notably dangerous.

Upon this point, too, opinions are much divided. We will now consider the means at our command for the reduction of the dislocation.

First, it is not to be denied that in many cases *general treatment* is sufficient to produce very excellent results. The flexion

may be caused by a flaccid state of the uterine tissue, which is merely a part of the general condition, the patients being delicate, atonic, and, for the most part, decidedly chlorotic women. In such persons it is quite often possible so to strengthen the whole organism, together with the uterus, by the use of preparations of iron, by cold sea, salt-spring, or iron baths, and by attention to hygienic rules, that the flexion either entirely disappears, or is at least so far improved as to relieve the most annoying symptoms.

Moreover, this general treatment may be supported by local applications, such as the cold douche upon the vaginal portion of the cervix, cauterization of the flabby mucous membrane, and astringent injections. Finally, some strengthening influence upon the muscular tissue of the uterus may be expected from the internal use of ergot.

Without other means, however, all these remedies can insure success only in certain selected cases, as mentioned above; at the same time, we do not hesitate to state explicitly that they are of extreme importance in many cases as aids to the mode of treatment we are about to describe.

Better success has attended the use of mechanical contrivances applied within the vagina or the uterine canal. The first step of the treatment is to replace the uterus; then an attempt should be made to retain the uterus in place by means of certain instruments.

The first step, then, is the *replacement* of the womb, which is best accomplished by the use of the hands alone.

In antelexions, the operator should introduce the finger into the vagina and rest the end of it against the cervix, so as to hold it in a fixed position, while with the other hand he presses down between uterus and symphysis till he can elevate and force back the fundus. If the uterus is flexible, this can easily be done, and the fundus may even drop over backward, so as to produce a retroflexion; but if, as is usually the case in congenital antelexion, the tissues of the organ are firm, it will be found possible to straighten it only to a limited extent, the uterus returning immediately to its old position the moment the hand is withdrawn.

The reduction of retroflexions is therefore of more import-

ance, and this also, in cases which are not too unfavorable, is to be done with the hands. Introducing one, or better, two fingers into the vagina, the operator should slightly raise the fundus, and then seek to push it forward by pressing with the other hand from behind through the abdominal wall. In more difficult cases, the object may still be accomplished by first passing the fingers from the body of the uterus—after they have lifted it to a certain height—round to the anterior aspect of the cervix, and then pushing the latter back into the hollow of the sacrum. The replacement may be effected still more easily per rectum, and in the knee-elbow position. In some cases, the following peculiar method will be found to possess certain advantages: the forefinger, introduced into the rectum, is used to elevate the body of the uterus, while at the same time the thumb in the vagina presses back the cervix.

If it is found impossible to replace the uterus with the hands, the intra-uterine staff may be used to advantage; it should not be used, however, unless the uterus is quite movable, for if the uterus is fixed by adhesions, all attempts at replacement are, of course, to be given up.

The use of the sound, so generally recommended for this operation, is attended with some danger, for, as the instrument, introduced with concavity downward, is turned over so that it may occupy the position which it usually has in the normal uterus, the uterine end is obliged to describe a long curve, a procedure which may subject the uterus to serious injury. This lateral excursion may, it is true, be avoided by using the sound in the manner recommended by Rasch,¹ *i.e.*, to keep the uterine end still while the lateral movements are made by the handle, which is finally depressed.

A still simpler and safer course is to replace the uterus by means of the *intra-uterine pessary*. In using the sound the operator holds the long arm of a lever, and thus is liable, without intending to do so, to exert undue power; while with the intra-uterine staff there is no chance to exert power, and the uterus can be but slightly irritated.

¹ London Obstet. Trans., Vol. XIII., p. 247.

With the intra-uterine pessary (see Fig. 59) replacement is effected as follows: the staff, introduced into the uterus in the manner described below, converts the retroflexion into a retroversion. The bulb, lying then just behind the symphysis, is pressed back by the finger into the hollow of the sacrum, and the cervix is carried with it, while the stem, performing a half revolution about its transverse axis, carries the fundus forward. By this method the manipulation is still guided as much by the sense of touch as in the manual method, and may be desisted from in good time, if any obstacle is met with.



FIG. 59.

Intra-uterine pessary, for straightening the uterus.

It rarely happens that the dislocation is finally relieved by simply replacing the uterus, owing to the fact that the inclination to return to the old position usually remains. The cases in which this favorable result happens are generally those in which the displacement is of recent date and the uterus enlarged. In two cases, which occurred in my own practice, I was able to verify the fact that a fully retroflexed uterus retained its normal position after being placed there but once. In the first case the displacement occurred several weeks after normal labor; in the second, nine days after an abortion at the third month. In neither was the uterus much enlarged, and in both it had always previously been in normal position.

In those cases, however, which usually present themselves for gynecological examination, and in which there is a displacement of long standing, it is not at all to be expected that the uterus will retain the normal position without the use of some mechanical means adapted to this end. Both the vagina and the canal of the uterus have been used as bases from which to accomplish this result.

It is, of course, clear, that if the result can be satisfactorily accomplished from the vagina, it is to be preferred. Any instrument introduced into the genital canal is a source of irritation, some more, others less. The mucous membrane of the vagina is not so delicate as that of the uterus, and, even when irritated,

the symptoms are much less troublesome and dangerous than those caused by the more susceptible lining of the uterus. If, then, success is possible with instruments which lie in the vagina merely, it is by all means better to use them.

Since the cervix preserves very nearly its normal position in flexions, yielding but slightly in a direction opposite to that taken by the body of the uterus, it is plain that nothing is to be gained by the use of the common pessaries intended to maintain the normal position of this part. Since in retroflexion, however, the dislocation of the body backward is made more difficult by keeping the cervix far back in the pelvis, we may, under circumstances not too unfavorable, prevent the return of the deformity by retaining the cervix in this position by means of a vaginal pessary. An anteflexion is not much influenced by bringing the cervix forward, and cannot, therefore, be managed in this way.

This method (in retroflexion) is certainly both more rational and more effective than any attempt to secure the same object by filling the posterior cul-de-sac with a large tampon, which does not answer the purpose at all, in fact rather favors a return of the displacement by crowding the cervix forward.

The artificial dislocation of the cervix backward, by which the retroflexion of the body is to be prevented, may be accomplished in several ways. The first idea is, naturally, to keep the cervix back by means of eccentric rings, *pessaires à contraversion* (see Fig. 60),¹ the thick side of

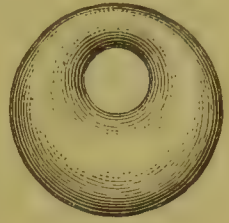


FIG. 60.
Eccentric vaginal pessary.



FIG. 61.
Lever pessary in position.

¹ See *Martin*, l. c., p. 66, who used them in the reversed position.

which is placed anteriorly. These rings, however, cannot be used, because they soon turn around, thus driving the cervix forward and favoring a return of the displacement.

Better than this is Hodge's lever-pessary, which, to be sure, does not act by lever power exerted upon the body of the uterus, but by so stretching the posterior cul-de-sac that the cervix is drawn backward (see Fig. 61). In cases in which the tendency to a return of the displacement is not very considerable, it will sometimes keep the uterus in its normal position.

The lever-pessary, which does not act, however, upon the principle of a lever, was invented by Hodge¹ and recommended in Germany more especially by G. Braun,² Martin,³ and Spiegelberg.⁴ It is found in a variety of forms, of which the one without anterior cross-bar (see Fig. 62) is decidedly to be condemned, because the ends of the branches wound the vagina.⁵

In many cases the complete rings, with single (see Fig. 63) or double curve (see Fig. 64), which tightly stretch the vaginal cul-



FIG. 62.
Hodge's pessary, open anteriorly.



FIG 63.
Hodge's lever pessary, with
single curve.



FIG. 64.
Hodge's lever pessary, with double
curve.

de-sac, are very useful. The flexible ones, which are made of copper wire, covered with rubber, and can be bent into the shape required for each particular case, are better than the ones made of hard rubber.

Since the idea of elevating the body of the flexed uterus by lever power working from the vagina is an entirely mistaken one, we must condemn the form of pessary proposed by Graily

¹ Wiener med. Wochenschr., 1864, Nos. 27-31.

² Diseases Peculiar to Women. Phil., 1860.

³ M. f. Geb., B. 25, p. 403.

⁴ Würzb. med. Z., 1865, B. VI., p. 117.

⁵ Not to mention the possibility of introducing them through the urethra into the bladder, three cases of which have now been reported in America (see *Edwards*, Bost. Gyn. J., Vol. III., 1870, p. 36).

Hewitt,¹ the peculiarity of which consists in its being provided with a curve intended to pry up the anterior vaginal cul-de-sac. It is not only incorrect in principle, but experience shows that it is not well borne.

Somewhat similar is the anteversion pessary proposed by Thomas,² which consists of Hodge's pessary, upon the anterior aspect of which a horse-shoe lever is attached, intended to support the uterus.

Schultze has lately proposed an entirely unique form of pessary, intended to keep the cervix well back in cases of retroflexion. The different shapes are shown in Figs. 65 and 66.



FIG. 65.
Schultze's pessary for retroflexion.



FIG. 66.
Schultze's pessary for retroflexion.

The lesser curve of the first receives the cervix, while the branches of the long curve are supported by the floor of the pelvis or the rami of the pubic arch. By this, as well as by the retrograde curve of the second form, the cervix is kept up and back, so that the recurrence of the dislocation is even more perfectly guarded against than by Hodge's pessary. I have used the instrument as yet only in a few cases, and have found it on the whole efficient, but at the same time I am convinced, as in fact Schultze himself admits, that it will not always answer the purpose. In one case, in which the cervix was held back perfectly well, the body, nevertheless, soon returned to its flexed position again, and the symptoms were not relieved.

We must, however, admit that Schultze's pessary answers its purpose as well as any vaginal instrument can, and, since the method of treatment from the vagina is more sparing of the parts and less dangerous than the intra-uterine method, we

¹ Brit. Med. J., Feb. 2d, 1867. Lancet, Nov. 16, 1867, and Lond. Obst. Trans., IX, p. 63.

² Diseases of Women, 3d ed., p. 362.

consider that Schultze has made a valuable contribution to our stock of mechanical contrivances for the support of the uterus.

It has been sought to attain the same object by means of pessaries which take their support from outside the body. Lazaréwitsch¹ recommends a pessary resembling the Roser-Scanzoni hysterophor, made of copper wire covered with rubber; and Cutter² has invented one which derives its support from an elastic staff or rod, which rests upon the sacrum and is held in position by an abdominal belt. The instrument has been modified by Thomas.³

But the surest method of bringing the uterus into its normal position, whether in case of retroflexion or antelexion, is by means of a straight stem introduced into the cavity of the uterus itself. Winkel⁴ has given a detailed history of the various attempts made to retain the uterus in position after it has once been replaced, and in the same work he gives illustrations and descriptions of the different instruments used.⁵

First of all, those apparatuses are to be condemned which support an intra-uterine stem by means of a belt fastened round the pelvis, since every shock received by the latter is communicated to the uterus.

On the other hand, the simple intra-uterine stems, with a knob at the vaginal end, fail to fulfil the therapeutic indications, their action being merely to convert the flexion into the corresponding version, without restoring the uterus to its normal position.

The problem is, then, to contrive some apparatus for the vagina which will so far fix the intra-uterine stem that the uterus will be obliged to preserve approximately its normal position, not being immovably fixed, but allowed a certain amount of play.

¹ Coup d'œil sur les chang., etc. Paris, 1862.

² Boston Gyn. J., Vol. V., p. 174.

³ Diseases of Women, 3d ed., pp. 363 and 379.

⁴ L. c.

⁵ Besides the authorities cited, consult also *Lumpe*, Woch. d. Zeitschr. d. Gesel. d. Wiener Aerzte, 1857, No. 15; *G. Braun*, Wiener med. Wochenschr., 1864, Nos. 16-19; *Huarterman*, Petersb. med. Z., 1862, II., p. 171; *Hildebrandt*, M. f. Geb., B. 29, p. 300; *Olshausen*, M. f. Geb., B. 30, p. 353, and Archiv f. Gyn., B. IV., p. 471; and *Savage*, Obstetr. J. of Great Britain, Nov., 1873, p. 503.

The solution of the problem has been attempted in a variety of ways. Generally the stem has been connected with a vaginal pessary, as has been done by Detschy,¹ in his hysteromochlion, by Martin, in his elastic regulator, and by Winkel, Schultze, Löwenhardt,² Beigel,³ von Düring,⁴ and others.

Most of these instruments labor under two disadvantages, viz. : the stem is fixed in the middle of the pessary, and the two are immovably connected. With such an apparatus it is impossible, in the first place, to force the uterus over to the opposite side from that which it has occupied, as it is desirable to do; and, in the next place, the pessary sinks, thus withdrawing the stem so far that it lies merely in the cervix. If the stem is placed eccentrically, the pessary is apt to turn round and assume the position which favors a return of the uterus to its old position. Besides all this, the stem attached to the vaginal pessary does not allow sufficient play to the uterus.

I have found the purpose best answered by a tampon of cotton, so placed in the vagina as to hold the head of the pessary in any desired position, in retroflexion, for instance, far back, so that the uterus is strongly anteverted. It is, to be sure, a somewhat complicated process, but I am confident that no other will entirely supply its place.

I am in the habit of using, for the purpose of keeping the flexed uterus straight, a small stem of bone with a wooden knob, as shown in Fig. 59.

The chief desideratum in an intra-uterine pessary is lightness, which is secured by the use of a variety of materials, such as ivory, bone, horn, wood, or hard rubber. The stem must be rather slim, but firm, with end well rounded, and not so long as to touch the fundus. The knob lying in the vagina must not be too small, and it is better to have it of spherical shape, this form not being so apt to wound the vagina as a disk. Those intra-uterine pessaries which retain their place by means of a spring (the stem separating into two elastic branches when it is placed in position), as recommended by Kiwisch and C. Mayer, and later by Greenhalgh,⁵ Wright,⁶

¹ Wiener med. Wochenschr., 1857, Nos. 29-31.

² Berl. klin. W., 1873, No. 35.

³ Wiener med. W., 1873, No. 12.

⁴ Deutsche Klinik, 1874, No. 1.

⁵ Lancet, 1866, I., p. 468.

⁶ Ibid., p. 200.

and Chambers,¹ irritate the uterus so much that their use is entirely out of the question.

The stem is simply introduced with the hand alone. The left forefinger touching the os serves as a guide for the point of the instrument, which is held in the right hand. It goes easily enough as far as the internal os, and then a little manipulation becomes necessary. If, for instance, there is a strong anteflexion, the ball of the pessary must be pressed as far as possible backward and upward, the moment the point of the instrument is actually within the internal os. In this way the flexion can be overcome entirely, *i.e.*, while the body of the uterus remains undisturbed, the cervix is carried so far back that its canal runs in nearly the same direction as that of the corpus. This done, the stem slips readily into the cavity of the uterus. In retroflexion the procedure is the same, except that the ball is pressed forward and upward, instead of in the contrary direction.

This method of introduction is the least dangerous, because, by allowing the corpus uteri to retain its position, and by causing the stem to enter in the direction of the axis of its cavity, the least amount of irritation is produced. If the operator tries to straighten the organ by forcing the stem on in the direction of the cervical canal, the wall of the uterus (the posterior in anteflexion, the anterior in retroflexion) will necessarily be much bruised.

Once in the uterus, the stem, of course, overcomes the flexion; but if left to itself the uterus will remain in the corresponding version, so that by the mere introduction of the pessary we only convert a flexion into a version (see. Fig. 67).

Now, in order to correct this version, and give the uterus temporarily the opposite displacement, we introduce, in retroflexion, for instance, wads of cotton between the ball of the pessary and the anterior vaginal wall, until the former is crowded as far back as possible (see. Fig. 68), which compels the uterus to assume an anteverted position. If, now, an additional wad is introduced to keep the stem in the uterus, the condition of anteversion

¹ Obstet. J. of Great Britain, April, 1873, p. 21; May, 1873, p. 115, etc.

may be kept up at will, and still the instrument is not so firmly fixed but that sufficient play is allowed the uterus.

The procedure is, to be sure, somewhat complicated, as the tampons must be changed every day, or at least every second day. They very soon become impregnated with the vaginal secretion, and are thus rendered offensive; and even if this be somewhat delayed by the use of glycerine, still they get out of place so soon that frequent removal becomes necessary.

In efficiency, however, this method, in my opinion, surpasses all others, since it enables us to give the uterus any desired posi-



FIG. 67.

The intra-uterine pessary, after introduction in a case of retroflexion; it causes the uterus to assume the position of retroversion.



FIG. 68.

The intra-uterine pessary in the same case, but after the uterus has been brought into the position of anteversion and held there by suitable means.

tion, and to maintain it in that position for weeks together. In treating a retroflexion, for instance, the uterus is placed in anteversion, so that the intra-abdominal pressure is exerted upon its posterior surface, our hope being that after a time it will retain its place after removal of the pessary. To be sure, this hope will not always be fulfilled, for the inclination of the uterus to resume an abnormal position, in which it has lain

perhaps for years, is extraordinarily strong. Still, in certain cases, the displacement is cured for good, and in others there is at least decided improvement.

The principal objection made to the intra-uterine method is not so much its inefficiency, as that, for the results obtained, it is too dangerous.

In order to avoid the dangers referred to—principally inflammation of the uterus and its connections—it is quite necessary to select proper cases for the treatment. We have already called attention to the necessity of leaving the uterus alone, if fixed in its abnormal position by adhesions, for in such a case it is impossible to replace it without serious stretching or tearing of the adhesions. In all these cases the intra-uterine method of treatment is out of the question. It is further contra-indicated by an existing inflammatory condition of the uterus or neighboring organs, metritis as well as endometritis, parametritis, or perimetritis. If an inflammatory exudation takes place in the vicinity, or if the uterus itself becomes sensitive, the treatment must be given up. (Where great prudence is exercised, an exception may be made in cases of chronic inflammation of the uterus of very long standing.)

The cases, then, which are adapted to the intra-uterine method of treatment, are the pure flexions uncomplicated by inflammatory processes. Very good results sometimes attend its use in congenital ante flexion, where the intolerable pain attending menstruation immediately disappears with the introduction of the stem, and conception not unfrequently follows years of sterility. Retroflexions, too, as they occur in nulliparæ,—though, to be sure, they are rarely seen,—may produce much the same symptoms, and are eminently well suited to this method of treatment. It is comparatively seldom that suitable cases of acquired flexion are met with in women who have borne children, owing to the fact that this condition is much oftener complicated with inflammatory processes, and that it is usually accompanied by less troublesome symptoms, so that patients are less willing to carry out a long course of treatment.

Even after a suitable case has been selected, it is by all means advisable to exercise the greatest caution in the beginning

of the treatment. It is my practice always to introduce the pessary at the house of the patient, and to require her to remain in bed for three days. At first, I do not attempt to accomplish more than the conversion of the flexion into the corresponding version, allowing the body of the uterus to retain its position at least for a time (see Fig. 67); if, in the mean time, the instrument has caused no trouble, I undertake the correction of the displacement on the second or third day. After a few days more have gone by, and the patient has not manifested any symptoms of inflammation, I allow her to resume her usual mode of life. After this, so far as my experience goes, inflammation is not apt to occur.

At the catamenial periods I remove the pessary, either with the fingers, or, where this is difficult, with forceps. This is done not only for the sake of cleanliness, but also because, at this time, there is greater likelihood of inflammation, though this by no means regularly follows when the precaution is neglected.

I am therefore disposed to regard the method of treatment by intra-uterine pessaries as very efficient, in appropriate cases, and not particularly dangerous. To be sure, if proper prudence is exercised, it is only a relatively small part of the flexions that can be so treated. But we must keep the fact in mind that in the majority of these cases the displacement as such does not admit of a permanent cure.

The attempt has been repeatedly made to relieve the displacement by operation, and, as a general thing, the operation has been devised upon correct principles. In backward displacements, for instance, the attempt is made to unite the posterior walls of the vagina and vaginal portion of the cervix by means of cauterization,¹ or by freshening² the surfaces.

Löwenthal³ has proposed another method, but it is incorrect in principle, and has never been practically tested. The most radical operation is that of Köberlé,⁴ which consists in performing laparotomy and fixing the uterus in the lower angle of the incision.

Neither can we recommend the operation for anteflexion devised by Sims,⁵ by

¹ *Courty*, *Mal. de l'utérus*, 2d ed., p. 876.

² *Richelot*, *L'union médicale*, 1868, Nos. 58 and 59.

³ *Die Lageveränderungen d. Uterus*. Heidelb., 1872.

⁴ *Schetchig*, *Med. Centralb.*, 1869, No. 27.

⁵ *Loc. cit.* p. 155.

which the posterior wall of the cervix is split as high as the internal os; it is attended with danger, and at most relieves only a symptom of the flexion, the stenosis of the internal os, an object which may be safely attained in some other way.

If the conditions of the displacement are such as to preclude any attempt at replacement, we are restricted to merely *palliative treatment*, which in most cases avails to render the patient tolerably comfortable.

The painful symptoms which depend upon the flexion as such, that is, more particularly dysmenorrhœa, and at times vesical derangements, are the ones specially amenable to the intra-uterine treatment, and will occupy our attention less in this place. The question here is chiefly in regard to the symptoms arising from the complications (especially simultaneous chronic inflammation of the uterus). Of course the displacement is usually the cause of the complication; nevertheless, the accompanying disease can always be much alleviated, and by a proper regimen its reappearance, or at least a return of the worst symptoms, may be prevented.

It is not necessary to repeat here the treatment for the different complications. We will only mention, as of particular importance, that the very troublesome symptoms (pain and hemorrhage), caused by increased size and chronic inflammation of the uterus, may be best controlled by slight, frequently repeated scarifications. By this palliative treatment we may, in favorable cases, succeed in putting an end to the symptoms complained of, although the displacement still continues.

In discussing the treatment, we have thus far considered the flexions only, and for the reason, as before given, that we consider them far more important than the versions, and because anteversion never, and retroversion only now and then, occurs without complications, *i.e.*, without inflammatory swelling of the uterus.

The principal indication in anteversion will be to get rid of the inflammatory thickening of the uterus, which, as above mentioned, is best done by scarification. After the tissues have returned to a comparatively healthy condition, the uterus may either lie in a normal position, or continue to be anteverted.

If the attempt to diminish the swelling proves ineffectual, and the worst symptoms are caused by the malposition, or if, as very often happens, they are induced by the extreme mobility of the swollen uterus, the patient may often be entirely relieved by the introduction of a simple vaginal pessary, best, one of Mayer's rubber rings.¹ The instrument acts by holding the vaginal portion in the centre of the pelvis, and thus preventing it from making too great excursions, and also by giving the body (since in versions the two portions retain their proper relation to each other), a position more nearly normal. The frequently recommended abdominal support, the *ceinture hypogastrique*, acts in much the same way, by restraining the movements of the swollen uterus. That it should have any favorable action upon the displacement seems out of the question.

Pure, uncomplicated retroversion occurs not very rarely as a temporary condition, and needs then no particular treatment. The patient should be enjoined to empty the bladder often, and to avoid any great or sudden exertion, since the latter, happening when the bladder is distended, is likely to cause permanent retroversion, and, at a later date, retroflexion. If the uterus is permanently retroverted, the intra-uterine stem will render excellent service. The treatment is easier and prognosis better than in retroflexion. If retroversion is complicated with chronic inflammation, the same course should be followed as in anteversion, though retroflexion is quite apt to follow the disappearance of the inflammation.

LATERAL DEVIATIONS OF THE UTERUS.

Tiedemann, Von den Duverney'schen Drüsen, etc. Heidelberg, 1840.—*M. B. Freund*, Breslauer klin. Beitr., II. Breslau, 1864, p. 85.

Lateral displacements of the uterus are of congenital origin, being usually caused by some peculiar development of the pelvic viscera, and they are certainly only in very rare instances pro-

¹ *C. Mayer*, Monatschr. f. Geburtsh., B. 21, p. 416.

duced by foetal inflammation of one of the broad ligaments. Moreover, a slight tendency of the fundus to lean toward one side, usually the right, is physiological. Owing to the plastic state of the uterus during foetal life, congenital dislocations always occur in the form of flexions and not of versions.

In extra-uterine life we may have either form. Lateral displacements are often caused by tumors. Parametritic exudations force the uterus first toward the opposite side, and finally, as they cicatrize, draw it to the side in which they are situated. Other tumors of slow growth (fibroid, ovarian), so long as they are small, sometimes draw it in their own direction, but later crowd it the other way.

Excepting the slight degrees of displacement, which are to be regarded as physiological, it is rare to find uncomplicated cases of lateral dislocation, *i.e.*, cases not caused by other important disease. Now and then, however, we do meet with cases of strong version combined with slight flexion (the uterus being freely movable) where it is impossible to discover a cause for the displacement. I have observed a high degree of version (toward the left) with torsion, in a woman confined only a week previously; it was so marked that the anterior surface of the womb faced toward the left. The uterus could be straightened, but it immediately went back again to its former position.

Uncomplicated cases can hardly be said to cause symptoms, and when there are complications, the displacement becomes of entirely secondary importance. Any particular treatment is, therefore, very rarely necessary.

EXCESSIVE MOBILITY OF THE UTERUS.

Where there is abnormal mobility of the uterus, a state to which we have before only casually referred, we must carefully distinguish whether the uterus is bent or stiff, that is, whether the mobility consists in its assuming readily a position of flexion or one of version. In the latter case we shall find the uterus swelled, and the neighboring organs flaccid. The subjects are usually women who have borne children, in whom vagina, bladder, rectum, and uterine appendages are very much relaxed,

while the uterus itself is chronically inflamed, hard, and somewhat enlarged. So circumstanced, the uterus falls freely hither and thither in the pelvis, with the changing positions of the body, so that at different times we find ante-version, retro-version, or latero-version. In some cases the change of position is slight, in others, very great.

This excessive mobility causes severe symptoms, such as pain in the abdomen and back, trouble in passing water, often a feeling of uncertainty, sometimes inability to walk, and, furthermore, severe disturbances of the nervous system.

The diagnosis has to be made by means of the bimanual examination, repeated at different times and in various positions of the patient, and by attempting to alter the situation of the uterus. If this can easily be done, and in a high degree, the mobility is greater than normal.

The treatment of these cases is very satisfactory. As a rule, the symptoms yield as if by magic, the moment the uterus is fixed, and this can be done sufficiently well by means of a Mayer's rubber-ring pessary, which keeps the cervix in place, and so prevents any extended excursion of the corpus which is so inflexibly connected with it.

On the other hand, extreme mobility of the flexed uterus is usually found when the organ itself is very loose in texture, and especially when a small fibroid in the flaccid corpus uteri causes it to sag hither and thither with the various movements of the patient. It is only in these latter cases that a slight mobility of the flaccid uterus gives rise to symptoms at all, and then by no means in such degree as in the condition just described.

The treatment, however, is much more difficult. In many cases little or no complaint is made, so that there is no call for interference. In others we must try, in the ways elsewhere detailed, what can be done by constitutional treatment to improve the general health, and, with the aid of local irritation, to make the uterus firmer.

If the mobility is caused by a small tumor, the abdominal supporter will oftentimes prove of use. As the tumor increases in size the mobility disappears spontaneously.

DESCENT AND PROLAPSE OF THE UTERUS.

Hendriksz, Descriptio hist. atque crit., etc. Berlin, 1838.—*Froriep*, Chirurgische Kupfertafeln.—*C. Mayer*, Verh. d. Ges. d. Geb. in Berlin, 1848, III., p. 123.—*Chiari*, Braun u. Spaeth, Klinik d. Geb. Erlangen, 1855, p. 384.—*A. Mayer*, Mon. f. Geb., B. 12, p. 1.—*O. von Franque*, Der. Vorfall der Gebärmutter, etc. Würzburg, 1860.—*Le Gendre*, De la chute de l'utérus. Paris, 1860.—*Huguier*, Mém. de l'acad. de méd. Paris, 1859, T. XXIII., p. 279, and Sur les allong. hypertr., etc. Paris, 1860.—*Klob*, Pathol. Anat. d. weibl. Sex. Wien, 1864, p. 83.—*Martin*, Mon. f. Geb., B. 28, p. 166, and B. 34, p. 321.—*Säxinger*, Prager Vierteljahrschr., 1867, 1, p. 89.—*W. A. Freund*, Zur Pathol. u. Ther. d. veralteten Inv. ut., etc. Breslau, 1870, p. 27.—*Spiegelberg*, Berl. klin. Woch., 1872, Nos. 21 and 22.—*Hüffel (Hegar)*, Anatomie u. oper. Beh. d. Gebärm. u. Scheidenvorfälle. Freiburg, 1873.

Historical Notice.

Prolapse of the womb is a condition which, as might be supposed, has been known from the earliest ages. Hippocrates refers to it, and Soranus devotes an entire chapter to the subject, wherein, to a certain degree, he combats the erroneous views of his predecessors. Thus he censures Euryphon, who undertook to cure prolapsus by suspending his patients for twenty-four hours by the feet; as well as others, who, like many later authors, fumigated the exposed uterus with offensive substances, acting on the supposition that, like a living animal, it would seek to escape the foul odor. (Mice and lizards were also allowed to crawl over the exposed organ, in the hope of frightening it back to its place.) Soranus himself, having placed the patient in an appropriate position, used to return the womb to its proper situation, and introduce a woollen pessary into the vagina for its retention. Portions of the uterus that had become gangrenous were excised, and sometimes even the entire organ was extirpated. The writers who followed Soranus, however, fell far below his standard. Indeed, it is only very recently that the pathological anatomy of descent of the womb has been more minutely investigated. In practice, many similar affections, such, particularly, as hypertrophy of the cervix, are still confounded with prolapse of the organ. We are principally indebted to Huguier for drawing a distinction between these conditions. This author, while on the one hand he was right in holding that the majority of the cases of hypertrophied cervix were mistaken for prolapse, went too far to the other extreme, inasmuch as he almost entirely denied the occurrence of true prolapse.

By descent and prolapse we mean changes of position of the uterus downwards towards the mouth of the vagina, so that the uterus leaves its normal position and the os uteri approaches, or even protrudes from, the mouth of the vagina.

Etiology.

In cases of considerable descent, or of prolapse, the predisposing cause will almost invariably be found to consist in a relaxation of all the pelvic viscera.

It is true that a transitory and physiological descent of the uterus takes place with every powerful act of abdominal compression; but the pressure being removed, the elasticity of the surrounding organs raises the womb to its place again. Where the pelvic viscera are not abnormally relaxed, it is only in very exceptional cases that acute prolapse is caused by the sudden excessive action of abdominal pressure (as by jumping, by a fall, by heavy lifting, or by vomiting, etc). When such a displacement is thus caused in a woman who has never borne children,¹ and in whom, therefore, the organs contiguous to the womb have never undergone the changes incident to pregnancy and the puerperal state, it must be due to a special extensibility of the parts concerned, dependent on an individual idiosyncrasy.

The predisposition being present, increased weight of the uterus and added force of abdominal pressure will be found among the first determining causes of prolapse.

As a rule, these causes co-exist. They are found to the greatest degree during the puerperal period, when relaxed pelvic viscera and an enlarged uterus are always present. If the intra-abdominal pressure is now increased, as in case of chronic overfilling of the intestinal canal, of large abdominal tumors, ascites, and especially of prolonged and severe bodily exertion, a displacement of the uterus downwards is very easily produced. In advanced age, relaxation of the organs of the true pelvis is liable to occur, aside from the puerperal condition, through the disappearance of adipose tissue to such a degree as to render prolapse possible. This is, indeed, no very rare occurrence, inasmuch as, when the pelvic viscera have become especially relaxed, a gradual descent, and eventually prolapse, may take place, even

¹ According to *Weinberg's* report of Martin's clinics (*Ueber Prolapsus uteri*, Diss. inaug. Berlin, 1869), only six nulliparous women were found among 174 cases of prolapse. *Scanzoni* found fifteen nulliparæ among 114 cases.

when the uterus is of normal weight and the degree of abdominal pressure is not excessive.



FIG. 69.
Absence of perineum.



FIG. 70.
Normal perineum.

When the womb shows a tendency to dislocation downwards, the question of whether complete prolapse can be accom-



FIG. 71.
Primary prolapse of the vagina.
c, cystocele; r, rectocele.



FIG. 72.
Primary descent of the uterus, with
inversion of the vagina.

plished with ease or with difficulty depends, in the first place, on the degree of resistance offered by the floor of the pelvis and on the size of the vaginal entrance. In this respect, the more serious lacerations of the perineum, Duncan,¹ to the contrary, notwithstanding, must be regarded as of the highest importance in the etiology of uterine prolapse. If the perineum has disappeared, it is evident, as is shown in Figs. 69 and 70, that the route taken by the descending uterus is shorter, and the direction more favorable for a descent; furthermore, the obstacles which it would otherwise encounter (pelvic floor, narrowness of vaginal orifice) are removed.

Primary prolapse of the vagina is also a circumstance of the greatest etiological importance. This much is certain, that, in the great majority of cases, prolapse of the walls of the vagina (see Fig. 71) precedes that of the uterus. It is much more rare for this organ to descend, as represented in Fig. 72, merely inverting the vaginal walls by its descent.

Notwithstanding all this, we cannot admit that primary prolapse of the vagina alone induces falling of the womb.

The tension of the prolapsed vaginal walls draws the uterus down, only when its attachments to neighboring organs are relaxed; and usually, no doubt, the relation of things is such that the conditions which induce prolapsus vaginæ likewise effect a relaxation in the neighborhood of the uterus and vagina, the same causes thus resulting in prolapse of the latter and descent of the former.

Pathological Anatomy.

As a rule, prolapse is practically divided into three grades or degrees:

1st. *Simple descent*, in which the uterus lies distinctly lower than is normal, but the os uteri is not visible between the labia.

2d. *Incomplete prolapse*, in which a part of the uterus lies outside of the vulva.

3d. *Complete prolapse*, in which the entire uterus, covered with the inverted vagina, lies outside of the external genitals, between the thighs.

¹ Edinburgh Obstet. Transactions, Vol. II., p. 269.

The vagina, if it is not independently displaced downwards, is more and more encroached upon with every descent of the uterus (see Fig. 72), so that the normal inversion of the vagina, whereby its mucous membrane covers only the vaginal portion of the uterus, becomes greater, and the vaginal mucous membrane thus encloses the larger part of the lower segment of the uterus. The further the uterus descends, the more is the vagina

turned inside out, so that in extreme cases of complete prolapse (see Fig. 73) the cavity of the vagina entirely disappears, and the vaginal walls descend directly from the vulva, covering the uterus, which lies between the thighs.

The vaginal mucous membrane, which is thus made to take the place of integument, undergoes very marked changes. It becomes hypertrophied in all its component parts—epithelium, submucous cellular tissue, and muscular coat. The greatest change takes place in the most superficial structures, the transverse folds, or rugæ, disappearing even in simple descent of the uterus, while in complete prolapse the mucous membrane is exposed to the drying influence of the air, and to friction between the thighs, until thickening of the epithelium results in a tissue strongly resembling epidermis.



FIG. 73.
Complete prolapse of the uterus,
c, cystocele.

posed to the drying influence of the air, and to friction between the thighs, until thickening of the epithelium results in a tissue strongly resembling epidermis.

Exposure to external injury often results in ulceration, or even in deeper losses of substance, which are usually covered with a yellowish tenacious discharge, and have elevated, puffy borders. The color of the vaginal mucous membrane is red, bluish-red, or even white, when there is no inflammation and the epithelium has become very much like epidermis. Indeed, this epidermoid alteration of the mucous membrane may be so complete that in negro women the inverted vaginal surface may become black.

In consequence of the blood-stasis that occurs within its walls, and the injuries to which it is exposed by its position, the uterus uniformly swells, so that the entire organ, and particularly its lower segment, becomes hypertrophied. The cavity is generally somewhat lengthened, though in the majority of cases not very much so, not over four or four and one-third inches (11 ctm.). Exceptionally, however, the supravaginal portion of the cervix may be so greatly hypertrophied that the fundus still occupies its normal plane, or it may even lie higher than is natural.

Those cases in which the fundus uteri has never descended, but in which only the lower portion of the organ has grown until it protrudes from the vulva, and which, therefore, represent primary hypertrophy of the cervix alone, are usually classified with cases of true prolapse. To this I cannot agree, but am of the opinion that the term prolapse should be applied only to those cases in which the entire uterus has primarily descended. Although the organ does not usually increase much in size, merely enlarging by venous engorgement, still it may, exceptionally, grow to such a degree that the fundus may rise to its former height, or even higher. The enlargement of the supravaginal portion of the cervix may then carry the bladder and the retro-uterine peritoneal fold up again, so that both may be about at their normal site. These cases, which, however, are tolerably rare, are hard to distinguish from primary hypertrophy of the supravaginal portion of the cervix. The differential diagnosis between the two was treated of under the head of hypertrophy of the cervix. We would here only remark that a considerable degree of ectropion of the os argues in favor of primary prolapse with secondary hypertrophy.

Through the infiltration of the vaginal mucous membrane, which is displaced outwards, and the simultaneous swelling of the cervix, the conical form which normally belongs to the vaginal portion of the cervix is lost, so that, leaving the mouth of the womb, the mucous membrane extends abruptly outwards, in order, then, to cover the lower uterine segment, no part of which can any longer be considered as vaginal. The os uteri is therefore to be found at the lower end of the globular tumor, directed somewhat posteriorly. It may exhibit a condition of marked ectropion (called *eversio* by Martin), due to the fact that the vaginal walls, being put greatly on the stretch by the prolapse, draw the margin of the external mouth apart in every direction. The cervix is so turned inside out, by this means, that the external mouth may be formed by the middle portion of the cervical

canal. Indeed, the canal may be completely everted, so that the lower portion of the prolapse is covered with cervical mucous membrane, and the internal mouth takes the place of the external. On the other hand, in very old women, in whom the lips lie close together, the external mouth may be closed by adhesion.



FIG. 74.
Incomplete prolapsus uteri.
c, cystocele.

The relations of the remaining viscera of the true pelvis are of the greatest practical interest. The descending uterus (see Fig. 74) carries with it the bladder and the retro-uterine peritoneal fold; the posterior wall of the vagina also sometimes drags down a diverticulum of the rectum, so that, in a complete prolapse, the bladder lies more or less extended over the anterior wall of the uterus; behind the uterus there may be a rectocele, and then the fold of peritoneum dips deep down between uterus and rectocele.

The bladder is usually displaced in such manner that the orifice

of the urethra is apparent on the anterior surface of the parts prolapsed, and the canal of the urethra is usually directed from here downwards, opening into the bladder at a lower plane, though it may be irregular in its course, leading first upwards and then down. A part of the cavity of the bladder lies above the inner opening of the urethra, and a part, constituting the cystocele, lies below. If the prolapsed parts are not returned during micturition, the urine will stagnate in this dependent portion of the viscus, which may lead to vesical catarrh and to the formation of calculus.¹ Distortion of the fundus of the bladder may also lead to compression of the ureters, with the condi-

¹ The formation of calculus has been observed, in cystocele, by *Ruyssch* (42 stones), *Gosselin*, *Goupil*, and *Huguier*.

tions liable to arise in consequence, viz., dilatation of the ureters, hydronephrosis,¹ etc.

In some few instances of complete prolapse there is no cystocele, the wall of the bladder having detached itself from the cervix and having remained at its normal site.

The rectal diverticulum may be enormous, as was particularly shown in the case observed by Freund.²

The peritoneum generally descends, behind, to the utmost point of the prolapse, but in front it remains at its normal height, about on a level with the internal os, or it may even lie



FIG. 75.

Diagrammatic representation of the retroversion of a descending uterus.



FIG. 76.

Complete prolapse of the anteфлекed uterus
u, uterus; F, a fibroid situated at the point
 flexion; B, the bladder; D, intestine; L, at-
 tachments of the uterus, of one side.

higher. Douglas' space is sometimes occupied by coils of small intestine; in rare instances these are so abundant and so adherent as to render the replacing of the prolapsed parts impossible.

The uterus also drags the remainder of its appendages with

¹ *Phillips* (London Obstet. Tr., XII., p. 276), *Froniep* (l. c., Taf. 338, 5 and 6, and 416, 3 and 4), *Virchow* (Verh. d. Ges. f. Geb. in Berlin, Bd. II., p. 209), *C. Braun* (Zeitschr. d. Ges. d. Wiener Aerzte, 1864, p. 44). The last two cases were instances of cervical hypertrophy.

² *Locus cit.*, p. 27.

it. The broad ligaments are greatly stretched, and only admit of the prolapse of the organ gradually, as they become more and more relaxed. Then they leave the sides of the pelvis, and occupy a hollow between the bladder and rectum, the floor of which is formed by the fundus uteri. At the edge of this hollow lie the tubes and ovaries, rendered hyperæmic by stasis of the blood-stream.

As the uterus in its descent must maintain the direction of the vaginal canal, and as this direction is from above downward, and from behind forward, that organ always takes the position of retroversion (see Fig. 75), and its normal curve forward is lost. Both these changes are easily effected, inasmuch as the womb prolapses only when the pelvic organs are relaxed. Its descent, as well as its retroversion, are the result of this relaxation; but it is incorrect to look upon the latter as the cause of the descent. It is very easy for the influences already set forth, by their continued action, to transform a retroversion into a retroflexion,¹ so that we can readily understand why the prolapsed womb should frequently be retroflexed. Antelexion is rare,² inasmuch as the position of the uterus in its descent is such that this change can only be produced when the faultily developed organ is very unyielding, or is held fast by adhesions.

In the case delineated in Fig. 76 the antelexion could not be corrected, during descent, on account of a small fibroid tumor located at the point of flexion, and which, no doubt, had already contracted adhesions.

When prolapse occurs suddenly, perimetritis may follow, or it may arise later as an intercurrent affection, fixing the uterus in its new position by the formation of adhesions, and thereby rendering the prolapse irreducible.

Symptoms.

In those very rare instances in which prolapse occurs acutely, the sudden emptying of the abdominal cavity and the dragging

¹ *Schott* (Wochenblatt der Zeitschr. d. Ges. d. Wiener Aerzte, 1861, No. 31) publishes a case in which the fundus of a retroflexed and prolapsed womb had caused gangrene and perforation of the vaginal wall against which it lay.

² *Franque*, l. c., p. 8, No. 7, Tafel 2, and *Freund*, l. c., p. 36.

on the peritoneal bands lead to symptoms similar to those observed in inversion of the uterus, viz., severe abdominal pain, fainting, and profound nervous shock.

The gradual descent of the organ produces a sensation of weight and dragging in the pelvis and pain in the back. Even in cases of complete prolapse, the disturbances are often no more serious than this—aside from the accompanying mechanical inconvenience; indeed, exceptional cases may occur in which, the uterus being of normal size, all the usual symptoms fail. (I saw one such instance, in which the prolapsed parts protruded to the distance of nearly a foot.) As a rule, it is true, this condition is accompanied by a tormenting feeling of weight or pressure downwards, and a pain in the back which sometimes becomes almost unbearable. Urinary disturbances are soon added, caused by the dislocation of the bladder and the decomposition of urine in the diverticulum; patients are sometimes unable to pass water unless they at least partially replace the prolapse. Trouble with the rectum may also arise, and nervous manifestations, even to the point of well-marked hysteria. All physical exertion causes pain, because the womb is thereby pressed downward, and its attachments, already put to excessive tension, are still further dragged upon. These pains may be made extremely severe by the effort of coughing, vomiting, the lifting of heavy weights, as well as by any great bodily labor.

Another series of symptoms depends upon the mechanical injuries to which the tumor lying between the thighs is exposed. Whereas, at first, the womb spontaneously recedes at night, upon lying down, or indeed only protrudes after several hours of severe exertion, it gradually remains down longer at a time, even if it can still be put back at night, until finally, by reason of its constantly increasing size, or on account of adhesions that have been formed, it becomes almost or altogether irreducible. The tumor lying between the thighs, even though it may be returned at night, interferes, in the highest degree, with every sort of occupation, so that, if the prolapse is great, an active life becomes impossible. The more the tumor lies outside, the more readily are erosions produced, by means of friction and the macerating influence of secretions, both on the integument of the

thighs and on the vaginal mucous membrane covering the part prolapsed. On the latter it may result in large ulcers, with diphtheritic or ichorous surfaces. The bladder may be opened by the process of ulceration; large portions of the uterus, which have become gangrenous, may be cast off, or the whole organ may be detached by the same process.¹

Menstruation is usually not interfered with. Sometimes it is scanty, at others profuse. Sterility is by no means a constant result, inasmuch as coition may be accomplished after the replacement of the tumor. In some cases it would appear that, in this act, the enlarged cervix has taken the place of the vagina.²

When the prolapsed uterus becomes impregnated it usually recedes as it enlarges.

The course of this malady is usually quite chronic. The prolapse, if nothing is done for it, gradually increases, and finally becomes irreducible, owing to the increased size of the womb and to peritoneal adhesions. The weight of the tumor hanging between the thighs, and the ulcers developed upon its surface, combine to render the condition of the patient one of extreme distress.

Diagnosis.

The very circumstance, that the diagnosis of uterine prolapse seems such a simple matter, doubtless accounts for the fact that it is often not distinguished from other similar affections, such, particularly, as hypertrophy of the cervix.

One difficulty in the way of diagnosis arises from the fact that women ordinarily present themselves for examination at a time when the prolapse has been reduced. Sometimes it can be made to protrude again by causing the woman to strain or cough; at other times, when this condition is produced only as the result of prolonged bodily labor, one must depend, for con-

¹ The numerous cases recorded in former times of the casting off of the prolapsed uterus by means of gangrene are unreliable, and doubtless, in most instances, refer to the expulsion of new growths. More recent and reliable cases are reported by *Elmer* (see *von Franque*, l. c., p. 11) and *Edwards* (*Brit. Med. Journ.*, Feb. 6th, 1864).

² See the cases of *Chopart* and *Harvey*, in *von Franque*, p. 14, and *Aubinais* (*Gaz. des hôp.*, 1866, No. 96).

firmation of the patient's statements, on the alterations that have been produced in the vaginal mucous membrane.

If the prolapse is down, the tumor protruding from the vulva, lying between the thighs and covered with the everted vagina, is so characteristic that there are few other conditions for which it can be mistaken. Especial difficulty attends the differential diagnosis between this and hypertrophy of the middle and upper portions of the cervix. I have already expressed myself on this subject in the chapter devoted to the study of the latter affection.

The mistake of confounding a large polypus for prolapse, which may be made when an ulcerated spot on the former simulates the os uteri, will be corrected on a more careful examination of the parts.

It is not enough for the conscientious physician merely to determine the existence of prolapse; he must ascertain the position of the uterus, by combined manipulation and the use of the sound, the relations of the bladder by means of the catheter, and the existence or extent of a rectocele by the introduction of a finger, or, in bad cases, of sounds into the rectum.

Prognosis.

Prolapse of the womb is an exceedingly chronic affection, which, it is true, but rarely endangers life by means of gangrene, peritonitis, or even uræmia, but which, left to itself, constitutes a very burdensome and disgusting evil. Excepting in very recent cases, a radical cure is but seldom accomplished, although the annoyances incident to the condition may be removed, or at least materially relieved, by the employment of appropriate therapeutic measures.

A spontaneous cure is very rare. It occurs most frequently by means of the uterus being bound down in its normal position through peritoneal inflammation, the peritonitis happening to supervene while the organ occupies its proper place, as, for instance, after its replacement subsequent to parturition. In quite exceptional instances inflammation, with cicatricial contraction of the vagina, holds the uterus back; or it may be

drawn up into the pelvis again, as is done temporarily during pregnancy, by the development of large tumors growing on or connected with the uterus, such as fibroid or ovarian tumors.

Treatment.

We will not enter upon the question of prophylactic measures, which concern, to a great degree, the proper management of the puerperal woman.

When prolapse exists, one may endeavor to effect a radical cure in harmony with the etiological conditions present: 1st, by diminishing the weight of the uterus; 2d, by correcting the relaxed condition of its attachments; 3d, by removing all excessive abdominal pressure; and 4th, by narrowing the distended vaginal entrance, or, better yet, by replacing the lost floor of the pelvis.

Leaving out of consideration for the present the fourth indication, which is essentially operative in its character, there is no denying that, with due patience on the part of physician and patient, a good deal may be accomplished by careful attention to the first three requirements.

In the majority of cases, the abnormal volume of the uterus may be pretty thoroughly, though perhaps very slowly reduced, in the manner spoken of under the head of chronic metritis; abdominal pressure may be reduced to its minimum by prolonged maintenance of the horizontal position, with a somewhat elevated pelvis. The most difficult matter is to do away with the relaxation of the uterine supports, though even here something may be accomplished by the cold douche and invigorating diet.¹

Still it is only in exceptional cases that the prolonged main-

¹ *Andreef* (Virchow's Archiv, 1872, Bd. 55, pp. 525), recommends, after the replacing of the uterus and the healing of any ulcers that may have existed, that the vaginal walls be painted with tincture of iodine (about ʒ ss. diluted with an equal quantity of alcohol). This application, which may gradually be made stronger, should be applied every three or four days, and injections of cold water (68° Fahr.) should be used during the intervals. The action of this treatment is not to contract the vaginal canal, but to strengthen the uterine ligaments.

tenance of a recumbent position, the cold douche, and antiphlogistic treatment directed to the uterine swelling accomplish a cure.

The wearing of an appropriate pessary, by supporting the heavy uterus, and preventing it from dragging on its attachments to neighboring organs, may cause those attachments to regain a certain degree of tensity, so that sometimes the pessary may only have to be used temporarily.

In all attempts to combat the condition of prolapse, care must be taken to insure regular evacuations of the bowels and bladder.

The radical treatment indicated above ordinarily requires so long a time for its accomplishment, and promises, besides, such uncertain results, that it is usually abandoned for the scheme of reduction of the prolapse and its retention by means of pessaries.

The *reduction* is generally easy, if one does not attempt to return the vagina first, but presses directly against the lowest portion of the tumor. The position of the uterus must be carefully regarded, otherwise, in crowding the organ backward against the sacrum, an artificial retroflexion may be produced. If the womb is returned to the pelvic cavity while still in a state of retroflexion, and a pessary is introduced, this will either not be tolerated or will cause perimetritis by its pressure against the fundus. The perimetritis may, it is true, result in a cure of the prolapse by binding the uterus fast in its place; but it is accompanied by other evils, and may, indeed, be the immediate cause of death. Such cases have been seen by Freund¹ and by myself.² The unpractical character of the proposition to cure prolapse by inducing an artificial retroflexion is self-evident.³

If the reduction is found difficult, the first thing to be done is to insure the emptying of the bladder and bowels. If it is still found impracticable, we may, by maintaining the patient in the recumbent position, by the use of cathartics, and finally by scarification, effect such a diminution in size of the prolapsed

¹ Loc. cit., p. 32.

² Volkmann's Klinische Vorträge, No. 37, p. 334, and another case recently.

³ Seyfert, Prager Vierteljahrschrift, 1853, B. I., p. 156, and Aveling, London Obst. Trans., XI., p. 215.

parts that the reduction can usually be accomplished by an energetic effort, unless prevented by the existence of adhesions, or, more rarely, by large abdominal tumors.

Pessaries can only be used immediately after the replacement of the prolapse, if no ulceration exists. Ulcers, however, usually heal quickly, if the parts can be kept in their place and the secretions washed away by means of injections, so that we seldom have to cauterize them.

The increased size of the womb often disappears soon after its permanent replacement.

Amongst the *means for retention*, the *vaginal pessaries*, two kinds are to be distinguished, viz., those with and those without a stem passing outside of the vagina. The latter class, or those without such a stem, find their support in the vagina itself, and prevent prolapse by so filling it, and keeping the vaginal walls on such a stretch that they cannot descend and escape at the vaginal orifice. The uterus then lies on the pessary. Those having an external stem obtain their support from metallic bands or bandages attached to the trunk; they are therefore applicable to those cases in which the other variety of pessary cannot be retained, on account of relaxed vaginal walls or an enlarged ostium vaginæ.

In the course of time an extraordinarily large number of the most varied forms of pessary have been introduced. I shall confine myself to noticing a few of the most important of those which are still in use at the present day.

Without making more than a passing allusion to the custom of introducing a common bathing-sponge into the vagina, saturated with glycerine or with starch, or with some astringent lotion, we may mention, first among the stemless pessaries, *Mayer's India-rubber rings* (Fig. 77). A ring appropriate to the case must be selected, one not so large as unduly to distend the vagina, thereby causing pain or producing inflammation, and yet large enough not to escape too readily from the vaginal orifice. In some cases, with a very large vaginal opening, this accident cannot be avoided. If Mayer's ring pessaries answer the purpose, no other means of support will be required, inasmuch as, owing to their flexibility, they adapt themselves accurately

to the individual form of the vagina. If, therefore, the size has been well selected, the pessary lies as comfortably in the vagina as if it were made for that individual case, a matter of no little consequence to an inexperienced hand. Furthermore, this variety of pessary is less irritating than others, provided it is removed and cleaned from time to time, say every four weeks, and the vagina syringed out. (By way of exception, I have sometimes seen an ichorous discharge follow their use within a short time, probably because the material of which they were constructed was of bad quality.) If they are left in position for a long time, uninterruptedly, these, as well as every other kind of pessary, may produce the worst possible results. I have myself seen incisions into the soft parts, made by the ring, into which one could lay the entire first joint of the finger.



FIG. 77.
Mayer's India-rubber ring.

If, however, Mayer's ring pessary is kept clean, it usually irritates the parts but very little, and does admirable service, especially if the uterus is of normal size. I have even known a uterus measuring four and three-fourth inches to be reduced to three inches merely by the wearing of such a ring.

The *lever pessaries*, previously described, *made of hard rubber*, as well as the *rings of flexible copper wire covered with rubber*, may sometimes be used to advantage, as they are often of service when Mayer's rings will not hold. The advantage of their being capable of being bent to the desired shape is abundantly compensated for, in practice, by the fact that, owing to their thinner and harder edges, they are more liable to cut through, and thus prove a greater irritant to the vagina.

Inasmuch as, under ordinary circumstances, if the vagina is not uncommonly wide, the uterus can only descend in the axis of the vagina, thus assuming the position of retroversion in its descent, prolapse may be rendered impossible by forcing the organ to remain anteverted. This may be pretty well accomplished by the pessary of Vulliet,¹ as well as by the second form of Schultze's pessary (see Fig. 66).

¹ Nouveau moyen, etc. Genève, 1871.

In France, Gariel's pessaire à l'air¹ (a rubber bag filled with air) is in general use.

The *Zwank and Schilling hysterophor*² (see Figs. 78 and 79) consists of two plates of the form of butterfly's wings, which can be laid together or spread apart by means of a screw running through a stem or handle to which they are attached. The instrument has this advantage, that the wing-like branches, which are spread apart by means of the screw, after their introduction into the vagina, readily retain their place, and that the patient can

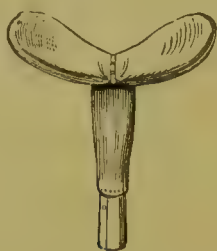


FIG. 78.

The Zwank and Schilling hysterophor,
covered with rubber.



FIG. 79.

The same, without the covering.

remove or introduce the instrument herself. Still, even a pretty large specimen is sometimes expelled from the vagina, after it has slipped around obliquely, or it may recede so far posteriorly that the prolapse partially descends in front of it. Another disagreeable thing about it is the annoyance of the stem lying between the labia (it belongs to the class of stemless pessaries, in spite of its stem or handle, as the latter is merely for the accommodation of the screw, and not for any purpose of an external support or fixation). The modifications of this instrument made by Eulenburg,³ Breslau, Savage, Coxeter, and others have not turned out to be improvements.

Pessaries that receive their support from the outside of the body can often be used where those just described are impracticable, on account of their escaping from the vagina. On the

¹ Gazette des hôpitaux, 1852, No. 55.

² *Zwank*, M. f. Geb., 1853, Bd. I., p. 215, 1854, Bd. 4, p. 184, and *Hysterophor*, etc., 2 Aufl. Hamburg, 1854. *Schilling*, Neues Verfahren, etc. Erlangen, 1855. *C. Mayer*, Verh. d. Ges. f. Geb. in Berlin, VIII., p. 5. *Chiari*, Zeitschr. d. Ges. d. Wiener Aerzte, 1854, p. 533. *Breslau*, Scanzoni's Beiträge, Bd., IV., p. 275.

³ Zur Heil. d. Gebärmuttervorfalles, etc. Wetzlar, 1857.

other hand, they have the disadvantage of being burdensome on account of their bands, straps, and stems.

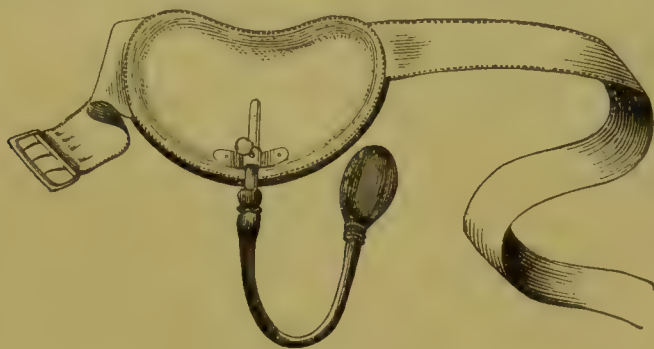


FIG. 80.

The Roser and Scanzoni hysterophor.

The best thing to use for the retention of the anterior vaginal wall, when this prolapses to a marked degree, is the *Roser and Scanzoni hysterophor*¹ (see Fig. 80). But the spring forming the curved arm must be selected to fit each individual case, for if the spring is too strong, the pad presses unduly against the soft parts, and if it is too weak, the pad is driven out of the vagina. Lazaréwitsch² recommends a similar instrument, the stem of which is made of copper wire covered with rubber, and which can, therefore, be bent as required.

If the posterior vaginal wall is the one that especially prolapses, or if the entire uterus descends evenly, the long extremity of a T-bandage may be passed between the thighs and padded at the point where it covers the vulva, so that the bandage mechanically prevents the



FIG. 81.

Scanzoni's bandage for the support of a prolapse.

¹ *Roser*, Archiv f. phys. Heilkunde, B. X., p. 80, and *Scanzoni*, Lehrb. d. Krankh. d. weibl. Sex., 4 Aufl., 1 B. Wien, 1867, p. 150.

² Coup d'œil sur les chang., etc. Paris, 1862.

descent of the prolapse; or a short stem may be fastened to the bandage, moving in a ball-and-socket joint, the upper extremity of which is button-shaped or is covered with a small sponge, and the prolapsed parts are thus supported. Such bandages are described by Seyfert¹ and Scanzoni.² Scanzoni's bandage is shown in Fig. 81.

In the application of pessaries, we must never forget that they are all foreign bodies in the vagina, and that they, therefore, all irritate. There is an immense difference, it is true, in the degree of this irritation. A good, well-fitting pessary increases the secretion of the mucous membrane but very little, especially if the decomposition of this secretion is prevented by frequent cleansing. Pessaries that are not well placed, and especially those that are too large, may cause peritonitis, ichorous inflammation, and the most extensive destruction of the soft parts. Von Franke cites a series of cases in which perforation into Douglas' space, the rectum, and the bladder took place.

As a rule, pessaries only give temporary relief. Indeed, the vagina, the relaxation and width of which have either induced, or at least favored prolapse, only becomes wider and more relaxed by their use.

If prolapse is to be radically cured, its cause must be removed. The general principles, which must here guide us, have already been pointed out. It only remains to indicate more particularly the operative procedures by which those indications are sought to be fulfilled.

As regards the immediate reduction in the size and weight of the uterus, the shortest way to accomplish this is by amputation of its lower portion. This operation, it is true, presents peculiar difficulties, in case of prolapse, as that part of the organ which can be removed without serious danger, viz., the vaginal portion, is very little developed, indeed has sometimes entirely disappeared. Attention has already been called to the fact that, as a rule, hypertrophy of the original vault of the

¹ Prag. Vierteljahrsch., 1867, I., p. 97.

² Lehrb. der Kr. der weibl. Sexualor., IV., Aufl. I., p. 151.

vagina entirely destroys the conical shape of the vaginal portion of the uterus, so that the entire prolapsed part assumes a globular form. In other cases this conical form disappears, because the dragging of the vagina results in a complete eversion of the external os. For these reasons it is quite common, in cases of prolapse, to find that the vaginal portion of the uterus can no longer be defined, having become lost in the surrounding tissues.

The question of whether amputation is practicable, or of how much can be amputated, must depend upon a careful examination of each individual case. First of all, it must be accurately determined how far down the bladder reaches. Somewhat below this line the anterior lip may be cut off, the incision being carried somewhat obliquely inwards. It is a much more difficult matter to avoid the retro-uterine fold of peritoneum, as we cannot possibly determine how far down it reaches, and it frequently descends to the lowest point of the posterior wall of the prolapse. Although not a matter of indifference, yet the wounding of this peritoneal pouch is not of positively unfavorable prognostic significance, as the edges, if carefully brought together with sutures, readily unite.

The particulars of the operation have already been discussed under the head of Cervical Hypertrophy and of Chronic Metritis.¹ We will only here remark, in addition, that amputation of the vaginal portion is the surest and quickest way to secure a diminution in the size of the uterus; and that the accomplishment of this end does not depend upon amputation of the largest possible piece, as involution of the organ also follows the removal of comparatively small portions thereof. The prolapse itself is of course not cured by amputation of the vaginal portion of the womb, but one of the causes that has produced and maintained this condition is removed. In certain exceptionally favorable cases it is true that, after involution, a complete cure may be

¹ In addition to the literature there cited, we may mention *Carl Mayer*, *Klin. Mitth. a. d. Gebiete d. Gyn.* Berlin, 1861, p. 33. *Scanzoni*, *Beitr. z. Geb.*, IV., p. 329. *Martin*, *Mon. f. Geb.*, B. 20., p. 203. *Braun*, *Wien. med. Woch.*, 1859, No. 30. *Munde* (*Braun*), *Am. J. of Obst.*, IV., p. 385. *Taylor*, *On Amput. of the Cervix Uteri*, etc. New York, 1869.

effected by maintaining a recumbent posture, and observing other remedial measures as indicated above. Generally, however, we are obliged to have recourse to other means, with the object of diminishing the relaxation of the uterine supports and restoring a resisting floor to the pelvis.

Both indications may be fulfilled by operative procedures. As regards the first, we are confined to operations on the vagina. Changes in this part are often the cause of prolapse, and even when this is not the case, the width and laxness of the vagina, to say the least, encourage prolapse.

Indeed, the attempt to cure prolapse by artificially narrowing the vaginal canal, is one of ancient date, and has been undertaken in two ways: either by endeavoring to produce a cicatricial contraction by the use of caustics, or by the excision of large pieces of vaginal mucous membrane. Girardin, Laugier, and others used the stick of nitrate of silver for this purpose; Phillips used fuming nitric acid; Laugier, Velpeau, Kennedy, and Dieffenbach, the actual cautery, applied lengthwise; Colles and Simon the same, applied in rings. Chipendale even attempted to excite inflammation of the vaginal mucous membrane by the application of gonorrhœal matter.

Marshall Hall was the first to introduce *elytroraphy*, that is, the narrowing of the vagina by cutting out pieces of mucous membrane, and stitching together the edges of the wound. He cut out long, oval strips from the anterior wall, introduced his sutures while the prolapse was out, then replaced it, and finally tied the sutures. Others, such as Dieffenbach, cut one or more strips out of various sides, and were followed in this practice by Velpeau, von Langenbeck, C. Braun, and others.

This narrowing of the vagina at random is not a rational procedure, as it can only now and then accomplish the desired end; for even the narrowed vagina soon again protrudes through its distended mouth, and the lower part of the uterus crowds down into the narrowed canal, which is exceedingly distensible, soon stretching it to its former size again.

The only circumstances under which we may expect a satisfactory result from this operation, are when the vaginal prolapse was the primary one, and when a definite portion of the vaginal

mucous membrane has become so relaxed and stretched that there is actually no room for it in the vagina. This is occasionally the posterior, and often—in case of cystocele—the anterior wall of the vagina. The methods employed for decidedly narrowing the anterior wall rest, therefore, upon a rational basis, are sometimes indispensable, and, if the case is properly selected, accomplish all that they can accomplish; that is, they prevent prolapse of the anterior vaginal wall, whereas they are not capable alone of preventing uterine prolapse. Consequently, after their adoption, one must still employ means of retention or proceed to other methods of operation.

The narrowing of the anterior vaginal wall may be accomplished in various ways.

Sims¹ has projected some original methods of *kolporaphia anterior*. He intended to remove a considerable part of the wall

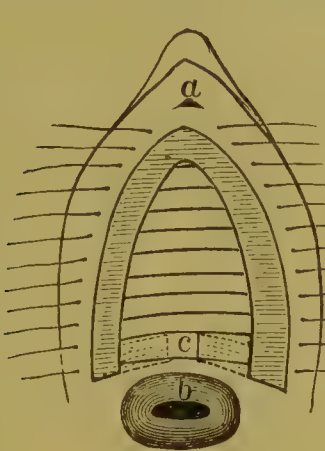


FIG. 82.

Narrowing of the anterior vaginal wall (*kolporaphia anterior*) according to Sims's method.

a, orifice of the urethra; b, os uteri.

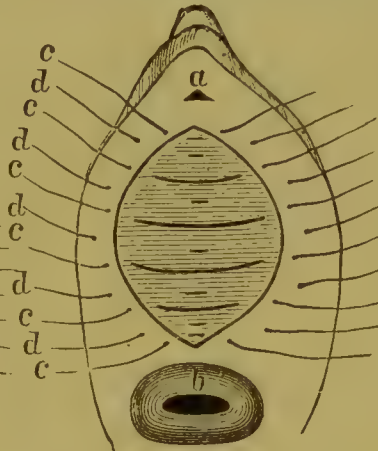


FIG. 83.

Narrowing of the anterior vaginal wall by freshening the entire surface and employing alternately superficial (c) and deep (d) sutures.

a, orifice of the urethra; b, os uteri.

between the bladder and vagina, and then to close the extensive fistula by means of sutures. He found, however, unexpectedly, that he had only removed the vaginal mucous membrane, and then he drew the edges of the wound together.

Subsequently, in order to render the operation less bloody, and to avoid the formation of deep-seated abscess, he only re-

¹ Loc. cit., p. 299.

moved a V-shaped strip (see Fig. 82), and then closed the wound, afterwards freshening a space at each of the open arms of the V, as shown by the dotted lines in Fig. 82. As Emmet¹ had observed that the cervix may crowd into the gap left at *c*, he freshened this bridge too (so that the whole part denuded resembled an isosceles triangle, with the apex towards the vaginal outlet), and then brought the sides together.

I prefer, in cases that demand narrowing of the anterior wall, to freshen the entire surface and bring it together with sutures, as is shown in Fig. 83. The bleeding can be held in control while freshening the surface, and is sure to stop on drawing it together. The formation of abscess may be avoided by not merely passing sutures through the mucous membrane, as was done by Sims, but by introducing deep sutures between the superficial ones. I have only performed the operation in one case (see Fig. 74), but in this it accomplished all that could be expected of it. The prolapse of the anterior vaginal wall ceased, and the uterus could be held in position by a Zwank's pessary, which was impossible previously, when the anterior wall descended like a bladder in front of the instrument. The uterus also became reduced in size from four and three-quarter inches to three and one-third inches.

Even if the width of the vaginal entrance is not the cause of prolapse in certain cases, as we have seen above, it very materially favors this condition, inasmuch as it admits of the escape of the uterus, which is disposed to prolapse, without further hindrance.

In former times the influence of such an enlarged vaginal entrance was over-estimated, and rupture of the perineum, with its attendant extension of the fissure of the vulva, was ranked as the most important etiological factor in the production of prolapse. It was very natural, therefore, that the attempt should be made to prevent the descent of the womb by narrowing the opening of the vulva. This was accomplished by the operation of *episiography*, that is, the freshening of the margins of the vaginal opening and uniting them by means of sutures. This

¹ New York Med. Journ., April, 1865.

method was first introduced by Fricke. The edges of the labia majora are freshened, beginning behind and advancing forward, until, in old women, only a small orifice is left for the escape of secretions, while in others a conjugal opening is preserved in front. If the edges are thoroughly freshened, the operation succeeds without any difficulty.

What is accomplished by this operation is, that at first the uterus cannot escape; but it remains down, and rests on the bridge of integument as on a perineal bandage. This condition of things would be a great gain, if it were lasting. Gradually, however, the uterus pouches out the integumentary covering, forming a sort of perineal hernia of the size of the former prolapse; or, not uncommonly, it crowds out at the opening which has been left. In some cases the support thus given, however, holds good for a long time, and takes the place of all other appliances. A procedure which is less to be recommended than that given above consists in closing the vulva by means of rings passed through its lips. Dommès combined beauty and utility when he united the labia by means of silver and golden rings.

All such methods, even at best, can only prevent actual prolapse, they have no power to raise the uterus to anything like its proper position.

In order to accomplish this we must aim not only to restore a longer perineum, but to construct a firm, thick, unyielding pelvic floor, capable of sustaining the weight of the uterus, and, in constructing this, so to narrow the vaginal canal as to render descent difficult. Such an operation is by no means to be confined to cases of old and extensive perineal rupture, but is also applicable where no rupture of the perineum has occurred, seeing that in every case of complete prolapse the posterior vaginal wall and the entire floor of the pelvis have become in the highest degree relaxed and atrophied.

Baker-Brown¹ first attempted to achieve this end by the following operation. Beginning at the posterior commissure, he denuded a portion of the vaginal surface and introduced several quilled sutures and interrupted sutures, the latter, however, only

¹ Surg. Dis. of Women, 3d ed. London, 1866, pp. 90 and 109.

through the perineum, so that the perineum was lengthened and the cicatrix extended only a short distance into the vagina. In case of cystocele, he furthermore removed from each side of the upper portion of the vaginal entrance a strip measuring one inch in length and three-quarters of an inch in width, and brought the edges of the mucous membrane together.

This procedure is also quite insufficient, actually amounting merely to an elongation of the perineum, and therefore accomplishing but little more than the operation of Fricke.

The method adopted by Simon¹ is particularly complete, although others (Veit, Hegar, Spiegelberg) adopted a combina-

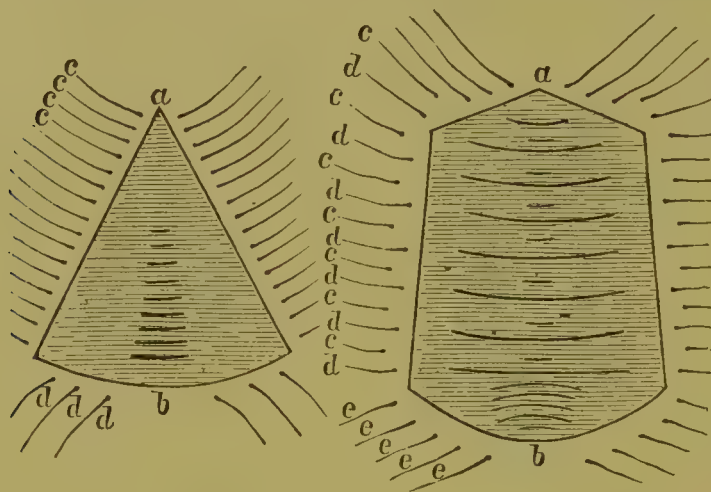


FIG. 84.

Hegar's perineauxesis.

a, apex of the freshened space toward the os uteri; *b*, its base at the frenulum; *c*, vaginal, *d*, perineal sutures.

FIG. 85.

Simon's kolporaphia posterior.

a and *b*, as in Fig. 84; *c*, deep, *d*, superficial, and *e*, perineal sutures.

tion of the operations on perineum and vagina (*episio-elytroraphy*) simultaneously with himself. Simon proceeds as follows in his *kolporaphia posterior*. He freshens a surface in the same way as Baker-Brown, except that he carries it further into the vagina, so that at the frenulum the surface denuded is from two to two and a quarter inches wide, and extends the same distance into the vagina, narrowing about a third of an inch at its further extremity. The two incisions are united above at an obtuse

¹ Prag. Vierteljahrschr., 1867, Bd. 3, p. 112, and von Engelhardt, Die Retention des Gebärmuttervorfalles. Heidelberg, 1871.

angle, the part denuded thus forming a pentagon. Simon does the freshening of the surface with a scalpel, operating through a fenestrated speculum. In freshening the upper angle an assistant draws down the parts by means of his finger in the rectum.

In bringing the parts together (see Fig. 85), two sutures are first introduced at the apex, *a*, and then follow superficial and deep sutures alternately. The first, *d*, are entered close to the edge of the wound, are brought out again about a third of an inch from the point of entrance, and are then carried across to be similarly passed through the other edge of the wound. The deep sutures, *c*, are armed with two needles, each of which is introduced a little to one side of the median line, and carried outward to a point one-third of an inch beyond the margin of the incision. The perineal sutures, *e*, are introduced like the deep sutures, but they are brought out nearer the edge of the wound, and so obviate the necessity of superficial ones. In tying, two superficial sutures are tied first, and then the deep one lying between them.

The subsequent treatment consists in quiet rest in bed, which must be continued for several weeks. The catheter is only to be used if difficulty is experienced in passing water spontaneously. It is not desirable to induce constipation; on the contrary, we should endeavor to secure light, thin stools.

Hegar¹ operates in a very similar manner in his "*perineauxesis*," except that he freshens a triangular surface, or rather a sector of a circle, and introduces only deep sutures (judging by the diagram). He uses silver-wire sutures, which, however, are of no special advantage, as silk ones can be left in place an indefinite length of time, as is proved by the instances in which they are sometimes forgotten.

By restoring a firm floor to the pelvis, and at the same time narrowing the vagina, excellent results may be secured; inasmuch as the vaginal portion of the uterus remains above the upper part of the newly formed pelvic floor, a fact of which we were enabled to convince ourselves in the case of a woman who had been operated on by Simon, three years before, and who was

¹ *Hüffel*, l. c., p. 31.

obliged to work hard. The uterus was found at about its normal height, and very slightly retroverted. Breisky¹ gives prominence to the idea that the bladder also finds support in the newly formed pelvic floor, and that thus the tendency to cystocele is abolished; as well as to the opinion that the acute angle at which the uterus and vagina stand to one another facilitates retention.

The most radical operation for the cure of prolapse is amputation of the entire uterus, which has recently been carried out by Choppin² and M. Langenbeck.³ The operation is justifiable in complications with a malignant new growth or gangrene of the organ. Aside from this, it can only be permitted very exceptionally in case of an exceedingly large irreducible prolapse.

ELEVATION OF THE UTERUS.

An abnormally high position of the uterus is only of symptomatic significance, as the organ is never spontaneously dislocated upward. The elevation is produced either because the uterus is pushed upward from below or drawn upward from above. It may be pushed upward by any tumor developed below it, such as an accumulation of blood in the closed vagina, hæmatocele, exudations, extra-uterine pregnancy, and other tumors, especially those of a malignant character, developing themselves in the true pelvis or the vagina. The uterus is more frequently drawn upwards, either through very large tumors (ovarian cysts or subserous and interstitial fibroids) or through peritoneal attachments. The latter fix the organ especially far up, if they have occurred during the puerperal state, when the fundus still lies high in the abdominal cavity.

In cases of uterine elevation the vagina is drawn out lengthwise, so that its mucous membrane becomes smooth, and the reflected portion of it, covering the vaginal part of the uterus, is unfolded. The vagina then becomes funnel-shaped at its upper

¹ Aertzl. Correspondenzbl. f. Böhmen, 1874.

² Amer. Journ. Med. Sci., 1867, p. 567.

³ Memorabilien, 18 Juli, 1868.

extremity, and in the depth of the funnel a little hole may be observed—the os uteri.

In extreme cases, especially those associated with ovarian or fibroid tumors, the uterus itself, and especially the cervix, may become elongated; indeed the latter may even be ruptured by the amount of strain brought to bear upon it.

INVERSIO UTERI.

Fries. Abh. v. d. Umk., etc., d. Gebärmutter. Munchen, 1804.—*Crosse*, An Essay, etc., Transact. of the Prov. Med. and Surgical Assn. London, 1845.—*Lee*, Am. J. of Med. Sc., Oct., 1860, p. 313.—*Gurtt*, Mon. f. Geb., B. 16, p. 11.—*Betschler*, Breslauer klin. Beit. z. Gyn., I. Breslau, 1862, p. 1.—*v. Scanzoni*, Beitr. z. Geb. u. Gyn., 1868, V., p. 83.—*Freund*, Zur Path. u. Ther. d. veralteten Inversio ut. puerp., etc. Breslau, 1870.—*Thomas*, Am. J. of Obst., II., p. 423.—*Spiegelberg*, Arch. f. Gyn., B. IV., p. 350 u. B. V., p. 118.

As we here omit the consideration of recent cases of inversion occurring in the puerperal woman, our attention will be directed to old cases and to such as are developed in connection with abdominal tumors.

Etiology.

Inversion may be produced, though much more rarely than in the puerperal state, by tumors attached to the uterine walls,—not those polypi that grow by a narrow stem, but tumors attached by a broad base which encroach upon the uterine cavity; or by those of a purely interstitial character (sometimes even very small in size). These growths may be fibrous or sarcomatous in nature. Inversion is doubtless brought about in this wise: the uterine foundation, or base of the tumor, which consists of normal uterine tissue, becomes atrophied (either disappearing or undergoing fatty degeneration) by means of the pressure which the tumor exerts. A gap is thus formed in the firm, contractile uterine tissue; the tumor sinks into the cavity of the womb, and is driven towards the mouth, both by its own weight and by the contractions of the organ. The os then opens, and the tumor sinks into the canal of the cervix, and thus the adjacent portions of the uterine wall being drawn down, a complete eversion is gradually accomplished. In some cases, how-

ever, after the tumor has sunk a certain distance into the cavity of the uterus, the inversion is rapidly accomplished by means of uterine contractions.

Pathological Anatomy.

Inversion of the womb is divided into three grades, as follows: 1st. That degree of inversion in which the fundus still remains above the external os. 2d. That condition in which the fundus has passed through the os, but still remains within the vagina (Fig. 86). 3d. Prolapsus uteri inversi, when the inverted organ has escaped from the vagina.



FIG. 86.
Inversion of the uterus.

The uterus, turned inside out and lying within the vagina, presents a rounded, sometimes quite swollen body, with a somewhat puffy, reddish or bluish surface (the inflamed uterine mucous membrane). At its upper portion the tumor becomes narrower, and forms a sort of pedicle lying between the lips of the os. These latter are distinctly to be felt, for a complete inversion of the organ seems to be impossible,—the cervix, through which the inverted uterine body has descended, retaining, at least in part, its normal position. This is

particularly true of the anterior lip. The cervix is completely involved in the inversion only when strong traction is made on the uterus; perhaps, in some exceptional cases also, through the weight of the tumor. After opening the abdominal cavity, on the dead subject, the site of the uterine body is seen to present a funnel-shaped depression, into which the tubes and ligaments of the uterus lead. In cases of long standing this funnel is very narrow (one-fifth of an inch at the outside), and the ovaries do not lie in it.

At a later period the uterus may undergo material changes ; a process of involution takes place, and the mucous membrane becomes smooth—more like a serous surface.

Symptoms.

In cases of uterine inversion dependent on the presence of a new growth, the hemorrhages which previously existed, and were caused by the tumor, continue, and, as a rule, debilitate the patient in the highest degree. Between the periods of hemorrhage an excessive mucous discharge is present.

In addition to this, pain in the back and in the abdomen is frequent. So also are difficulties of micturition. Still, it is remarkable how the organism may accustom itself to such a serious disturbance.

It occasionally happens that serious symptoms arise only at times, when the inverted organ escapes through the vulva.

Contraction of the cervix, which engirdles the body, may produce gangrene, with its usual consequences.

Diagnosis.

Under ordinary circumstances the inverted uterus can be recognized as such with certainty. It is true that it bears a striking similarity to a polypus, and the history as well as appearance of the tumor are often not sufficient positively to settle all doubt. Careful conjoined manipulation, however (if necessary, under chloroform), must determine the presence or absence of the uterus in its customary place. If it is absent, one may, in cases that are not too unfavorable, be able to feel a funnel-shaped depression or cleft at its former site, and can sometimes distinguish the uterine appendages emerging therefrom and spreading out like a fan.

If the tumor is pulled down strongly, this funnel may also be made accessible to the finger introduced into the rectum. In drawing the uterus down another evidence is sometimes produced which, alone, is capable of settling the diagnosis positively : this is the disappearance of the lips of the os from

around the pedicle of the tumor, inasmuch as traction causes the lower part of the cervix to participate in the inversion.

Exploration with the sound, too, must show that the pedicle of the tumor is everywhere continuous with the cervix, as it meets with resistance all the way around at the point of union, whereas, with a polypus, it should pass onward into the uterine cavity.

Occasionally the uterine orifices of the Fallopian tubes can be seen, and the diagnosis thus verified.

Prognosis.

Even old inversions of long standing justify an unfavorable prognosis, as they give rise to so constant a loss of blood. Still, even very old cases may be reduced, and, after replacement of the organ, pregnancy, too, may supervene, as is shown by the cases of Tyler Smith and of Emmet.

The spontaneous reduction of inversion is certainly very rare. One unequivocal instance of this kind has been observed by Spiegelberg, in which, after the patient had remained on her back for two weeks, during which time she suffered with severe diarrhœa, the womb was found to have returned to its normal position. Schatz explains this re-inversion as follows: During the quiet maintenance of the dorsal recumbent posture, the womb came to lie somewhat higher, so that the bands which pass down into the funnel were shortened; during the existence of diarrhœa a strong downward pressure was exerted on the cervical ring, while the shortened uterine attachments admitted of but a slight dislocation of the body downwards. The cervix, then, being powerfully crowded down, while the fundus remained at about the same height, the latter finally slipped back through the former.

Treatment.

Inversion is removed by replacement of the parts, which in recent cases is easy, in old cases very difficult to accomplish. This may be attempted, while the patient is under the influence of an anæsthetic, by pressing against the fundus with the

fingers or a pestle-shaped instrument, at the same time that the funnel formed by the inverted organ is pushed downward by another hand applied to the abdominal walls. As a rule, it is a comparatively easy matter to push the fundus up as far as the external os, inasmuch as the uterus becomes soft and yielding under taxis; its further progress, however, is accompanied with far greater difficulty.

The greatest variety of apparatuses have been introduced for the purpose of securing as powerful, constant, and effective pressure as possible. White,¹ of Buffalo, makes pressure against the fundus by means of an instrument, the upper bowl-shaped end of which embraces the fundus, while the other end, provided with a strong spring, rests against the breast of the operator. Braxton Hicks² uses peculiar-shaped rubber tampons, as does also Barnes, who likewise, urgently recommends incisions into the cervix. Noeggerath advises that one horn of the uterus be replaced first, whereupon the other readily follows. Emmet³ has several times successfully accomplished a reduction in the following manner: The hand, introduced into the vagina, takes the inverted uterus into the hollow of the hand, while the five fingers lie in contact with the point at which the organ is turned in. While the hand pushes the fundus up, the fingers are spread as forcibly as possible so as to distend the funnel. If by this means the fundus is carried above the plane of the os, the fingers crowd it up further, while the other hand, external to the abdomen, presses the ring of the cervix downward.

If the attempt at manual replacement fails, it becomes necessary to call into action long-continued pressure upon the fundus through the vagina. This may be best accomplished by means of the colpeurynter. I myself⁴ accomplished reduction by this means in a case that had existed for two years, and in which the most energetic attempts at manual replacement had

¹ Amer. Journ. Med. Sc., April, 1872, p. 391.

² British Med. Journ., August 31, 1872.

³ Obst. Journ. of Gt. Brit., April, 1873, p. 1.

⁴ Amer. Journ. of Med. Sc., January, 1866, and Amer. Journ. of Obstet., II., p. 213.

⁵ Berlin klin. Wochenschr., 1868, No. 46.

failed. The colpeurynter, considerably distended with water, was kept continuously in the vagina, and for several hours of each day it was so far enlarged as to exceed in size the head of a new-born child.

Emmet¹ produced continued pressure against the fundus, already pushed up some distance, by closing the lips of the vaginal portion of the uterus, beneath the fundus, with silver-wire sutures. The administration of ergot, whereby Freund brought about re-inversion, after pushing the fundus up as far as possible, might prove dangerous, seeing that if it does not accomplish its object, strangulation of the fundus is likely to be the result. (In Freund's own case, the use of ergot at first led to the beginning of gangrene.)

If the inversion is caused by a tumor, this should first be removed, whereupon reposition usually follows spontaneously within a few days. In Field's² case, however, in which the fibroid which had caused inversion was removed with the *écra-seur*, the uterus did not return to its place until a rubber tampon had been used for twenty days.

If all these means do not accomplish the end, and the annoyance caused by the inversion is very great, we may proceed to amputation, unless disposed, like Thomas, to perform gastrotomy. Still, it should be distinctly remembered that, according to recent experience, replacement of the organ has been accomplished in apparently hopeless cases, through perseverance and systematic effort, even though such a result is occasionally made impossible by the existence of firm adhesions within the funnel. The fact that an inversion has been of long standing is no argument against persistent efforts at its reduction, as we have reports of cases where replacement has been effected after a displacement lasting for years (as long as fifteen years).

Thomas caused pressure to be made through the vagina, on the encircling cervical ring, pressing it up against the walls of the abdomen; then he cut down upon it, enlarged the ring by means of a dilator made for the purpose, and then, with great difficulty, replaced the womb. Recovery followed, in spite of a perforating

¹ Amer. Journ. Med. Sc., Jan., 1868.

² St. Bartholomew's Hosp. Rep., 1872.

rent of the vagina, produced in the efforts of replacement, and in spite of considerable hemorrhage outwards, into the cavity of the abdomen. In a second case in which he operated, the patient died of peritonitis.

When, in any individual case, the dangers or annoyances of the condition are not too great, it is best to try to render them bearable without the aid of an operation. This is most readily accomplished at the beginning of the menopause, because then all coincident discomforts may, to a great degree, cease. The attempt may also be made by means of the chloride of iron, or other caustics, so to alter the uterine mucous membrane that the organ may lie within the vagina without hemorrhage or any considerable amount of secretion.

Amputation of the uterus has been undertaken in various ways. In former times the ligature was uniformly employed, and the organ was gradually removed by this means. Of late, the removal has frequently been direct and immediate, usually by means of the *écraseur*, though occasionally by the knife or scissors.

The direct removal, however, is the most dangerous method, both on account of hemorrhage and because after the uterus is cut off the cervix turns in, so that the bleeding surfaces of the wound are directed inward toward the abdominal cavity.

The best chances for recovery seem to lie in a combination of the ligature with subsequent removal of the organ. Adding some more recent cases to the statistics of Scanzoni, we have the following results:

	Total.	Recovery.	Death.
Simple removal.....	14	6 (43 per cent.)	8 (57 per cent.)
Simple ligature.....	26	19 (73 per cent.)	7 (27 per cent.)
Ligature and removal.....	29	24 (83 per cent.)	5 (17 per cent.)

The operation is accomplished as follows: a cord or wire is passed around the neck or pedicle of the tumor, lying in the vagina, and is drawn tight. This causes intense pain, and even produces evidences of shock and collapse, which not infrequently necessitate the loosening of the ligature. (Sometimes this has been the means of first establishing the diagnosis of inversion, where, previously, the tumor had been mistaken for a polypus.)

The uterus then swells considerably, and soon gives evidence of the beginning of gangrene, which we endeavor so to control by means of carbolic acid and chloride of iron as that it shall take more the form of dry mummification. According to the indications of the case, the whole, or a part of the ligated portion, is removed within a few days, or may be left for ten or fourteen days. The longer it is allowed to remain, the more complete will be the peritoneal adhesion of the funnel, so that the cervix, even if it turns in, only stretches these adhesions.

HERNIA UTERI.

Klob, Pathol. Anat. d. weibl. Sex. Wien, 1864, p. 105.

The non-pregnant uterus very seldom composes the contents of a hernial sac.

Only two cases of *crural hernia* seem to be on record: one of Lallement's,¹ in a woman eighty-two years old, and one of Cloquet's, in a new-born child, which Boivin and Dugès represent in Pl. XI., Fig. 3, of their Atlas.

Cases of *inguinal hernia* have been observed by Maret, Chopard, Lallement, and Cruveilhier.

The etiology of uterine hernia is most intimately connected with that of ovarian hernia (*descensus ovariorum*), to which we must here refer the reader, inasmuch as the dislocated ovaries drag the uterus after them.

The diagnosis cannot be difficult, with careful palpation and the use of the sound.

No especial therapeutics are to be thought of, as the uterus is irreducible.

FIBROIDS OF THE UTERUS (MYOMA, FIBROMYOMA, LEIOMYOMA).

Bayle, *Cervisart Journ. de méd.*, Ann. XI. Vendem. (1803, Oct.), and *Diction. des sc. méd.* Paris, 1813, T. VII., p. 72.—*Wenzel*, *Krankh. d. Uterus*. Mainz, 1816.—*P. U. Walter*, *Denkschr über fibröse Geschwülste der Gebärmutter*. Dorpat, 1842.—*Amussat*, *Mém. sur les tumeurs fibr. de l'utérus*. Paris, 1842.—*Th. S. Lee*, *On Tumors of the Uterus and its Appendages*. London, 1847.—*Chiari*,

¹ Bull. de la fac. de médec., 1816, I., p. 1.

Braun u. Spaeth, Klin. d. Geb. u. Gyn. Erlangen, 1852, p. 396.—*Routh*, Lettsomian Lectures, etc., Brit. Med. Journ., Feb.–July, 1864.—*Säxinger* (*Seyfert*), Prager Vierteljahrschr., 1868, 2, p. 93.—*Klob*, Wiener med. Woch., 1863, No. 35, etc., und Path. Anat. d. weibl. Sex. Wien, 1864, p. 149.—*Virchow*, Geschwülste, 3 B., 1 H., p. 107, etc.—*Kidd*, Dublin Journ. of Med. Sc., Vol. 54, 1872, p. 132.—*Goodell*, Phil. Med. Times, May 1, June 1, 1872.

Etiology.

Myoma, or the *round uterine fibroid*, is a new-growth, of extremely frequent occurrence, resembling in its structure the uterine parenchyma, but developed within the latter as a round tumor. The declaration of Bayle, so often quoted, that fibroids are to be found in 20 per cent. of the women who die past the age of thirty-five, may be extravagant; still, Klob, too, estimates the frequency of fibroids, among women who die over the age of fifty, as reaching 40 per cent. Thus much is certain, that it is one of the most frequent diseases of the uterus. The Americans assert that fibroid tumors are very frequent among negroes and mulatto women, and that even at an early age (twenty years) they are not rare. (Ovarian tumors and uterine carcinoma are said to occur but seldom among them.)

If we add thirty-six of my own cases, of which I have accurate notes, to those collected by Chiari and West, we shall obtain the following results with regard to the age at which the patients came under treatment:

	Age 20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 74.	Total.
No. of cases..	33	54	62	19	0	1	169

As these tumors often produce no symptoms until late, their origin must be dated back considerably; still, they do not occur before puberty.

Nothing at all is known with regard to the causes which determine or favor the development of fibroids. Undoubtedly some local irritation is at the bottom of it, but as to the variety or the origin of this irritation, we are completely in the dark.

Bayle considered abstinence from sexual indulgence and sterility as predisposing causes, but was evidently wrong with

regard to both. The great majority of women having fibroid tumors are married (among 514 cases treated by West, Dupuytren, Routh, and myself, 421 ($= 81\frac{9}{16}$ per cent.) were married); and undoubtedly a good many of those who were unmarried were still not shut out from sexual indulgences.

The relation of fibroids to sterility is exactly the reverse; sterility does not induce fibroids, but fibroids are often followed by sterility.

Among 196 patients treated by Dupuytren, Malgaigne, West, McClintock, and myself, we find that, omitting twenty-seven unmarried women who had never borne children, 119 were fruitful, and fifty sterile.

Pathological Anatomy.

Although composed of the same constituents as the normal uterine tissue, a fibroma or myoma does not, at the same time, represent a mere diffuse enlargement of the uterus, but develops itself as a distinct, round tumor, plainly separate from the parenchyma proper.

Microscopically the fibroid tumor consists of unstriped muscular fibre and connective tissue. If the former predominate, it may best be designated as a myoma, or, more accurately, a leiomyoma; otherwise, as a fibro-myoma or fibroma.

Both components are irregularly distributed. The muscular bundles are extensively interlaced with one another, and here and there amongst them are found bands of wavy connective tissue. The latter is, as a rule, firm, fibrous, almost cartilaginous; in other cases, however, it may be loose. The arrangement of fibres is nearly concentric, so that the entire fibroid consists either in a single lobe or in several lobes combined.

On section, the exposed surface is whitish, often reddish white or reddish gray. If it contains more tendinous tissue, the color, at certain points, will be a brilliant white. At the same time the cut surface appears lobulated, the pressure of the fibrous bands throwing up ridges upon it.

As a rule, the uterus is hypertrophied, its walls are thickened; sometimes, however, especially in subperitoneal fibroids,

it may be thinned by reason of being drawn out in length; and in old women it may be greatly atrophied.

Blood-vessels enter the tumor with the bands of connective tissue, though usually they are but few in number. It is exceedingly rare that any larger arteries dip into a fibroid.

The tumor apparently lies as a foreign body within the muscular substance of the uterus, inasmuch as it is separated by a capsule of loose connective tissue, from the parenchyma of the organ, and can readily be enucleated. Still, its development always begins in the uterine tissue itself, as a local hyperplasia, and it is not till later, when the well-defined tumor grows by the multiplication of the elements belonging to it, that it pushes the muscular fibres of the uterus apart, lies between them, and is capable of being separated from them and turned out. Nevertheless, a large fibroid is often continuously attached to the uterine parenchyma by quite a broad base. On the other hand, the tissue by which the tumor is attached to the uterus, and out of which it was, in fact, developed, readily atrophies; so that, then, the fibroid actually has no longer a continuous connection with the parenchyma of the uterus. In the latter case, the blood-vessels become obliterated at the same time with the pedicle, so that scarcely any vessels enter the substance of such an isolated and embedded fibroid.

As a rule, then, vessels of considerable size enter those fibroids which are intimately attached to the uterine substance, while those which are merely embedded therein are quite feebly vascular (the mucous membrane, even of the latter, however, may bleed quite profusely).

It is possible, however, for fibroids, especially of the large interstitial variety, to be so vascular that an actual cavernous structure is developed, resembling that at the seat of the placental attachment in advanced pregnancy. This form has been designated by Virchow as *Myoma telangiectodes, seu cavernosum*. Cavernous spaces filled with blood are then developed, "colossal capillaries," having a lumen varying in size from that of a hemp-seed to that of a pea, between which, sometimes, there remain but narrow ridges of muscular tissue. In rare instances, the whole, or nearly the whole, of the tumor is converted into such a

cavernous structure; usually the disease is confined to certain portions of the growth. Leopold¹ has described a colossal tumor of this sort, which had so enlarged the uterus that it resembled that of a woman in advanced pregnancy. According to Virchow, it is just in these cavernous myomata that we meet with an increase and subsidence of swelling. He explains this on the score of a greater or less supply of blood and the contraction or relaxation of the muscular substance.

The fibroid may also undergo other alterations, such as

Softening.

This may depend on

a. Simple œdema; for the fibroid may become so highly œdematous as to give fluctuation and be mistaken for a cyst. On puncture, however, nothing is discharged, or but a few drops of serous fluid. In œdema, the muscular fibre atrophies.

b. Fatty metamorphosis; the muscular cells undergoing fatty degeneration and being absorbed, thus establishing a process quite similar to that of puerperal involution. The tumor may thereby be materially diminished in size, and even entirely absorbed (see below).

c. Myxomatous degeneration. Between the individual lobes of a compound tumor, as well as between the individual fibre-bundles of a single lobe, mucous tissue is to be found. By the destruction of the cells and the secretion of considerable quantities of intercellular mucus, large collections of mucus may be formed, which create a semblance of degeneration.

Induration.

This takes place in connection with fatty metamorphosis, the muscular tissue undergoing fatty degeneration and the connective tissue becoming indurated. Perhaps the latter is the primary step, so that the entire process is to be regarded as an interstitial inflammation, and the fatty degeneration of the muscular fibres as the result of pressure produced by the cicatricial

¹ Archiv f. Physiol. Heilkunde, 1873, p. 414.

contraction of the connective tissue. The fibroid then becomes quite hard, tendinous, or cartilaginous.

Calcification.

The occurrence of induration, accompanied as it is by an arrest of growth, is followed by the deposit of the salts of lime. The presence of lime, in irregular veins, is first observed in the middle of the tumor. At a later period the deposit may be more considerable, so that it is difficult to saw through the tumor, and maceration betrays the existence of something like a coral formation. The deposit of lime is seldom so complete that the section is smooth and admits of a polish. It is very exceptional for the process to begin on the outer surface, forming a shell.

Calcareous degeneration occurs only in subperitoneal and interstitial fibroids. The latter variety may then be set free, in the manner described further on, and may be expelled as uterine calculi. As a general thing, calcareous degeneration is met with only in the smaller interstitial tumors; in very large ones it is extremely rare.

Calcareous myomata, which have been set free within the uterus, have engaged the attention of physicians from the earliest periods, under the name of "uterine stones." Thus, Hippocrates states that a Thessalian maid, sixty years of age (who during her youth was subject to severe pain on sexual intercourse), was seized with pains similar to those of labor, after eating leeks, and that a rough stone was extracted from the vagina. Salins tells of an old nun who was delivered of a stone resembling a duck's egg in size and shape. Another class of cases, which undoubtedly belong in the same category, are to be found especially in older literature.

Louis¹ knew of eighteen cases of uterine stone, and since that a number more have been observed, amongst others, by Velpeau, de Coze, Courty,² Duncan,³ and Arnott.⁴ Säxinger⁵ reports a case in which the surgeon applied forceps and delivered a uterine stone of the size of a child's head. Hénoque⁶ demonstrated by

¹ *Mém. de l'acad. de chir.*, 1753, T. II., p. 130.

² *Mal. de l'utérus*, etc., 2d éd., p. 932, weighing 10 kilogr.

³ *Edinburgh Med. Journ.*, August, 1867, p. 179.

⁴ *Medico-Chirurg. Transactions*, XXIII., 1840. Stone of fifty pounds, which tore the rectum by its weight on the occasion of a fall.

⁵ *Loc. cit.*, p. 113.

⁶ *Archives de Physiol.*, Juillet, 1873, p. 425.

a microscopical examination that a uterine stone obtained by Amussat, in 1829, was a calcified fibroid. In the Museum of Pathological Anatomy at Erlangen there is a very large submucous fibroid, measuring thirteen inches by eight and a half inches in diameter, which has become so calcareous throughout that a piece of the tumor which has been sawed out and macerated presents a structure similar to a coral. The specimen was furnished by Dr. Böhm, of Gunzenhausen, with the statement that the fibroid, weighing twenty-four and a half pounds, was taken from the body of an unmarried woman, sixty-one years of age, who had never borne children, and who died of marasmus. The tumor, which she first noticed at about the age of thirty, finally lay in a sacculated portion of the immensely distended abdominal walls, between the upper portions of the thighs, inclining particularly to the left side.

Another variety of nutritive disturbance may arise when the fibroid is cut off from the source of its nourishment by suppuration of its bed. This occurs most frequently after traumatic injuries. A degeneration, which is partly fatty, partly gangrenous, then takes place, and pieces of the tumor, or the whole of it, are expelled, accompanied by a fearful stench. A complete cure may be effected in this way, or death may ensue, with symptoms of septicæmia or of peritonitis, caused by the decomposing fibroid, with or without perforation into the abdominal cavity.

In addition to the simple fibroid, with its various alterations, some mixed tumors also occur, which are not without practical importance. The most frequent are cyst-formations in fibroids, which then constitute the *myoma cysticum*, or "*fibrocystic tumor*" of the English. These represent, not actual, newly formed cysts, supplied with a lining membrane, but merely gaps in the connective tissue, filled with serum. These are formed, during great œdema of the fibroid, by the tissue being driven apart at some points. For this reason, a large number of small cystic chambers are generally met with; still, the centre of the fibroid may be occupied by a large cavity filled with fluid, which has been formed by the softening and gradual dissolving of the tissue lying between the smaller cysts. The several cavities are surrounded and limited by bands of muscular and connective tissue, which also sometimes stretch across them as trabeculæ.

In addition to these, however, cysts of apoplectic origin may occur, which are formed in the usual manner by the effusion of

blood. These arise, if not exclusively, at least by far the most frequently, during pregnancy.

The formation of cysts may also originate in masses that have undergone fatty degeneration, by their breaking down into a detritus that becomes fluid.¹ The semblance of cyst-formation may also be produced through myxomatous degeneration of tissue.

It is under the first form especially that colossal mixed tumors arise, belonging to the largest forms of abdominal growths that exist. They are soft, and contain a multitude of cysts of various sizes.

Boinet,² at the same time, is doubtless correct in his assertion that in some cases reported as "tumeurs fibrocystiques," these have been confounded with the more solid ovarian cysts which have grown fast to the uterus, as well as with fibroids that are surrounded by peritoneal adhesions, within which, as is so often the case, a considerable amount of yellow serum accumulates. It appears that Péan³ describes these serous accumulations lying on the fibroid within pseudo-membranes as "tumeurs fibro-cystiques proprement dites."

Primary degeneration of fibroid tumors into carcinoma hardly ever occurs. Only one case, reported by Klob,⁴ is to be found in the whole field of literature, in which primary cancer originated in a fibroid. The metastatic development of carcinoma in a fibroid⁵ is also extremely rare; whereas the secondary extension of a widespreading carcinoma to the fibrous growth is not quite so uncommon. The simple complication of fibroid of the body with carcinoma of the cervix, which Courty⁶ likewise considered extremely rare, is far more frequent; although the views of Simpson, who considers that the irritation of a fibrous polypus in the cervix may be the direct cause of carcinomatous degeneration, appear to have but little foundation.

The transformation of a fibroid into a sarcoma, constituting a

¹ *Virchow*, l. c., p. 116, and *Graily Hewitt*, *Pathol. Trans.*, XI., p. 173.

² *Gaz. hebdomadaire*, 1873, No. 8.

³ *Hystérotomie*, etc. Paris, 1873, p. 88.

⁴ *L. c.*, pp. 163 and 188.

⁵ *Benporath* and *Lichmann*, *Monatsschr. f. Geburtsh.*, B. 25, p. 50, saw secondary deposits in carcinoma of the vagina.

⁶ *Mal. de l'utérus*, etc., II, édit., p. 933.

myosarcoma, seems to be more frequent. The intercellular tissue then begins to proliferate, at first smaller, afterwards larger round cells, with large nuclei, appearing therein. These multiply between the bundles of muscular fibres, crowd the latter apart, and gradually cause them to disappear. On section, those portions which have undergone sarcomatous degeneration present a homogeneous, white, or yellowish appearance, and are softer. We cannot as yet determine how often this change, from a benign fibroid to a malignant sarcoma, takes place. There is no doubt that it may take place. For further particulars, see the section on sarcoma.

Through softening of individual portions, and through apoplectic effusions, cystic myosarcoma may arise. The degenerated tissue may, in itself, be so soft—myxosarcoma—that one receives the impression of cysts filled with a mucous fluid.

After these general observations on the mode of origin, the structure, and the alterations of fibroids, we have yet to consider the several varieties separately, and they will be found to present differences of great practical significance.

In the first place, we distinguish fibroid of the body from that of the cervix, and divide the former into subserous, submucous, and interstitial fibroids, according as they lie more externally in the abdominal cavity, or encroach upon the cavity of the uterus, or, finally, remain situated within the parenchyma of the organ.

Fibroid of the Body of the Uterus.

a. *The Subserous Fibroid.*

The subserous fibroid (see Fig. 87 and Fig. 89 *SF'*), the external or peritoneal polypus of Virchow, is by no means developed exclusively from the outer layers of muscular fibres. As it grows outwards it naturally pushes the peritoneum before it. The pedicle varies in character. Either a continuous connection with the uterine parenchyma is maintained for a long time, in which case the fibroid usually grows fast; or the tumor separates itself early from the uterine wall, and then remains connected with the uterus only by a pedicle, which consists

externally of peritoneum, internally of subserous cellular tissue. The tumor may also entirely separate itself from the womb. If such fibroids are developed from the lateral borders of the womb, they may remain entirely extra-peritoneal, inasmuch as they grow between the two folds of the broad ligaments.

The complete separation of subserous fibroids is extremely rare; Virchow has never seen it, but Rokitansky mentions several such cases. Simpson¹ also met with this condition several times. West² observed one case, and Turner³ describes another in detail.

Those fibroids, which are no longer continuously attached to the uterine parenchyma, undergo tissue-changes but very slowly;



FIG. 87.

A large subserous fibroid, springing by a broad base from the posterior wall of the uterus.



FIG. 88.

A submucous fibroid, which has obliterated the cervix.

eo, external, o o, internal os.

still they may again become richly supplied with blood, through adhesions which they form with neighboring organs, especially with the intestines and mesentery.

¹ Obstet. Works, I., p. 716.

² Frauenkrankheiten, 3 Aufl., p. 330.

³ Edinburgh Med. J., January, 1861.

If subserous fibroids grow very considerably, they may draw the uterus upward so powerfully that the cervix, in particular, is greatly stretched, and may even be entirely separated from the body. Such cases are communicated by Rokitansky,¹ Times,² and Virchow.³ If the tumor, at the same time, turns on its axis, hæmatometra or hydrometra may result.⁴ Less frequently the fibroid, by its weight, displaces the uterus downwards so far as to produce prolapse of the organ.

Subserous fibroids quite commonly occur in numbers, so that it is exceptional to find solitary ones. The eruption of these tumors into neighboring organs, or outwards, will be treated of hereafter.

b. *The Submucous Fibroid.*

The submucous fibroid (see Fig. 88), growing inward into the cavity of the uterus, likewise does not, by any means, always arise from the tissue lying immediately beneath the mucous membrane, but often comes from the deeper parts, growing, by preference, towards the mucous membrane, which is pushed before it. Various tumors may result therefrom.

The growth may permanently retain the character of a *submucous fibroid*, by encroaching more and more upon the cavity of the uterus, while still remaining attached by a broad base, either being continuous with the uterine tissue at the point of attachment, or, if the pedicle has become obliterated, being simply embedded in that tissue.

The fibroid may, however, separate itself from the inner surface of the womb, like a polypus, its pedicle growing progressively thinner. These are the fibrous polypi, and their relations to the womb may be of two kinds. In the majority of cases the pedicle, which consists of uterine tissue, is preserved, so that the tissue of the polypus and that of the uterine wall are continuous. Under these circumstances the pedicle usually

¹ Handbuch d. Path. Anat. Wien, 1842, Bd. III., p. 547.

² London Obst. Transact., II., p. 34.

³ L. c., p. 161.

⁴ Virchow, l. c., p. 161, and Küster, Berlin Beitr. zur Geburtsh. und Gynaek., I., 7.

contains large vessels. The continuous connecting band of muscular tissue, may, however, atrophy, so that the pedicle consists merely of mucous membrane and submucous connective tissue.

The fibrous polypus, which, on account of its practical importance, will be considered in a separate chapter, is at first round, like all polypi, but afterwards readily becomes pear-shaped, or at least oval. If compressed by the natural orifices of the organ, it may assume the form of an hour-glass.

These polypi are usually tumors with a simple centre, so that it is but exceptionally that they exhibit a lobular structure. They almost always occur singly, that is, as polypi. Subserous and interstitial fibroids are frequently associated with them; the pressure of interstitial tumors, occurring at the same time, may flatten them considerably. They are softer than other fibroids, and undergo more rapid tissue-metamorphosis. They are not subject to calcareous degeneration.

c. The Interstitial, Intraparietal, or Intramural Fibroids.

Fibroids are designated as interstitial (see Figs. 89 and 90) when they constitute a portion of the wall of the uterus. At the same time they may project inwards or outwards, or in both directions. As a matter of course, transition-forms, from one of the three varieties of fibroid to another, also occur.

The original connection between the new growth and the uterine parenchyma is maintained longer in interstitial tumors than in any other variety. As a rule, therefore, large vessels are developed within their substance, so that they are the seat of the most active tissue-changes, and generally grow the most rapidly. The uterus is usually hypertrophied,—it is not very uncommon, however, for it to be atrophied. During the climacteric years, and even earlier, in exceptional cases, it may have quite thin, relaxed walls. Even very large interstitial fibroids have sometimes only one centre; very frequently, however, they are composed of several collections, so that they are then decidedly lobulated and uneven.

The tumors occur most frequently in the posterior wall and

at the fundus. They may become very large. Walter¹ saw one of 71 lbs., Binz,² one of 62 lbs. These very large ones exist solitary; smaller ones usually occur in connection with other fibroids of the same or of different varieties. Indeed their aggregate number may be extraordinarily large. Kiwisch³ and Cruveilhier⁴ counted forty such tumors, and Schultze⁵ saw a uterus in the body of a woman, eighty-three years old, which contained at least fifty fibroids.

Interstitial fibroids may project outward in the form of segments of a globe. The larger ones also project regularly inwards. The cavity of the uterus is thus lengthened and dis-



FIG. 89.

JF, an interstitial, *SF*, a subperitoneal fibroid.



FIG. 90.

An interstitial fibroid, with an os uteri that has been artificially dilated for diagnostic purposes.

torted in the most varied manner, especially if several tumors project into it from different directions. By this means, as well as by projection outward, especially into the broad ligament,

¹ L. c., p. 10.

² Deutsche Klin., 1857, No. 30.

³ Klin. Vortr., etc., 4 Aufl., Bd. I., p. 449.

⁴ Traité d'anatom. pathol., T. III., p. 656.

⁵ Jenaische Zeitschr. für Med. u. Naturw., 1870, Bd. V., p. 350.

and by irregular hypertrophy of different parts of the uterus, this organ may undergo the most peculiar alterations in form. The cavity, which is irregularly distorted, is often extremely difficult to find. The tubes, too, which are often so far dislocated as both to lie on one side or to change sides, are hard to discover. The pressure which the fibroids exert on one another may also give the tumors themselves peculiar shapes, such as hemispheres, or even segments of spheres.

The large size of these tumors greatly distends the abdominal walls, so that the abdomen equals or exceeds in size that of a woman in advanced pregnancy. Sometimes the belly is hugely pendent, or large hernial protuberances may be developed in its walls, in which the tumors lie. These sacs may become gangrenous through pressure, so that then the tumors lie fully exposed to the day.

Scarcely anything has been known, hitherto, with regard to this rare complication of large interstitial and submucous fibroids. Düll, in his *Inaugural Dissertation* (*Zur Lehre von den Uterusfibroiden*. Erlangen, 1872), which was never printed, describes two preparations to be found in the Institute of Pathological Anatomy at Erlangen, and collects several similar cases from the literature of the subject. One of these preparations (all notes of which during life are wanting) consists of an agglomeration of thirteen larger and smaller interstitial and subserous fibroids. The largest of these, springing by a pedicle from the right side of the fundus, had passed through a hernial opening of about twelve inches in circumference into a large hernia of the linea alba, and within this hernia had attained the size of twenty-six inches in circumference. A smaller tumor lies below and to the left, in a smaller hernial sac, and is but slightly adherent to the hernial opening, whereas the larger tumor is completely adherent to its ring. Other subserous tumors are also crowding into this ring. The large fibroid shows marked œdema, with the development of pseudo-cysts.

The second preparation shows similar conditions, only that here the skin covering the hernial sac has become gangrenous. This specimen, according to the communication of Dr. Degen, in Fürth, comes "from a woman sixty years old, in whom the first signs of a tumor in the abdomen had been observed twenty years before. Up to that time she had been well, had menstruated regularly, had never borne children. The tumor grew slowly. In 1852 a small umbilical hernia appeared, which, in spite of bandages, grew larger, bearing a relation to the growth of the tumor, which gradually crowded all the intestines out of the abdominal cavity. In consequence of this the woman frequently suffered from vomiting and disturbances of digestion. Menstruation continued regular and copious. In the summer of 1865 the lower portion of the very thin integument covering the um-

bilical hernia became gangrenous, so that finally the larger part of the tumor, which in the meantime had also protruded into the sac, became exposed to view. The woman died under hectic symptoms. The autopsy revealed nothing else of interest." The preparation shows an agglomeration of twelve tumors, of sizes varying from that of a hickory nut to that of a fist, which so cluster around the uterus on all sides as only to leave a small part of its posterior wall free. The largest of the tumors is interstitial, the others more subserous. The uterus was so turned on its axis that the largest fibroid, which arose from the right posterior aspect, lay in the hernia, and was finally laid bare to view.

Neuschler¹ describes a similar case. It relates to a firm uterine fibroid, weighing ninety-three pounds, four times the size of a man's head, which in the course of ten years had attained such a size that it caused the abdomen to hang down as low as the knees. In the year 1865 a gangrenous ulcer appeared at the most dependent portion of the abdomen, and soon terminated in death.

The cases of Loir and of Dumesnil, cited below, are of a different character, as the perforation of the abdominal walls was not caused by gangrene due to pressure dependent on the weight of the tumor, but was caused by the action of an inflamed gangrenous tumor perforating outward.

Fibroid of the Cervix.

Fibroids of the cervix, which are far more rare than those of the body, may arise in the same three forms as the others.

The submucous variety almost invariably assumes the form of a polypus, and, as such, very soon reaches the vagina, even though it may have originally arisen higher up in the cervical canal. In this case, too, the polypus, by its weight, may so far draw down the mucous membrane as that it shall appear to arise from the free edge of the lip. If the polypus attains a still greater size, it may itself become prolapsed, and lead to secondary prolapse of the uterus.²

Interstitial cervical fibroids may attain a very considerable size. They cause a uniform swelling of one lip, so that the mucous membrane of the other lip encloses it in the form of a semilunar fold. These tumors may become so large that the body of the uterus constitutes only a small appendage to them, crowded away to one side. Large tumors of this kind are de-

¹ Würtemb. Corresp.-Bl. 36, 2, 1866; see Schmidt's Jahrb., B. 133, p. 310.

² Chiari, Klin. d. Geb. u. Gyn. Erlangen, 1852, p. 401. Barnes, London Obst. Trans., III., p. 211. Freund, Breslauer Klin. B., 3 H., 1865, p. 165, and Müller, Scanzoni's Beitr., B. VI., p. 70.

scribed by Wenzel,¹ Fürth,² Boivin et Dugès,³ Murray,⁴ and Virchow.⁵ In Figs. 91 and 92 we give two representations of fibroids of the cervix from the Museum of Pathological Anatomy at Erlangen, the one being given in life size, the other in half the natural size.

The most rare form of cervical fibroid is that which grows outwards. Peritoneal polypi, properly speaking, consist only of those growths which arise from the posterior surface of the



FIG. 91.
Fibroid of the cervix. Natural size.



FIG. 92.
Fibroid of the cervix. Half the natural size.

upper part of the cervix. Those arising further down, as well as on the sides, usually grow into the connective tissue lying about the vagina, and may be felt, as knotty tumors, pushing forward the vaginal mucous membrane.

Symptoms and Course.

Fibroid tumors act in such entirely different ways, according to their location, that we must consider them separately.

¹ L. c., T. VII. and VIII.

² Diss. inaug. Bonn, 1854, T. 1 and 2, in a parturient woman.

³ Atlas, Pl. 21.

⁴ London Obst. Tr., VI., p. 184.

⁵ L. c., p. 219.

Subserous fibroids have scarcely any different influence on the condition of the uterus than that exerted by other tumors originating in the pelvis. Very small subserous fibroids, therefore, may be regarded with entire indifference, aside from the displacements to which they may give rise in the relaxed uterus. As they grow larger they act like other abdominal tumors. They crowd the uterus over to the opposite side from that on which they arise, or, when they become quite large, may also lift it quite a distance upward. The prominent symptoms, then, are a feeling of weight, bearing down, and pain in the back. Pressure on the bladder, or the displacement of the same upward, very uniformly produces a frequent desire to pass water, although compression of the neck of the bladder or of the urethra may cause retention of urine. Defecation, too, may be mechanically hindered, especially when the tumor is wedged fast in Douglas's cul-de-sac. The effects of the pressure exerted by the tumor manifest themselves, on the part of the nervous system, by pain, and sometimes by paralysis of the lower extremities, and, on the part of the veins, by œdema. Ascites may supervene, partly as the result of the pressure and partly through the irritation which the tumor produces in the peritoneum.

This irritation very commonly gives rise to circumscribed peritonitis, resulting in adhesions between the tumor and neighboring organs. According to the situation in which the tumor is thus fixed, relief or aggravation of the symptoms may occur (the latter particularly if it is confined in Douglas's cul-de-sac). Indeed, if a tumor which is thus held fast in Douglas's space continues to grow, it may give rise to symptoms of complete incarceration.

Chronic metritis often occurs as a complication, being caused by the pressure of the tumor, and giving rise to a variety of additional symptoms.

Sterility may result, partly due to the metritis, partly to the narrowing of the uterine cavity by the mechanical pressure of the tumor; or it may depend on a closure of the tubes, caused by the attacks of partial peritonitis.

The symptoms are usually aggravated during a menstrual

period, by the swelling of the uterus and fibroid which then takes place. Hardie¹ calls attention to the fact that at such times retention of urine sometimes occurs.

Subserous fibroids usually so far separate themselves from their bed that no continuous connection any longer exists between their parenchyma and the substance of the uterus. Their growth is then arrested either entirely, or nearly so, and they readily undergo retrograde metamorphosis.

Fibrocystic tumors resemble the above variety in general, and yet, as they grow more rapidly and uninterruptedly, and to some degree at least contain fluid, they show more similarity to ovarian cysts.

Submucous fibroids give rise to very early symptoms, because they distend the uterus itself. The stretching of the uterine mucous membrane which covers the tumor and is pushed forward by it in its growth, brings about leucorrhœa and hemorrhages. The latter are entirely from the mucous membrane, and may, therefore, occur even when the fibroid is quite poor in vessels. They arise from the large, thin-walled veins which are distributed throughout the distended mucous membrane. Sometimes they appear as menorrhagia, sometimes, however, they are independent of menstruation. They may be so great as to produce the highest grade of anæmia. Occasionally the hemorrhage is almost uninterrupted. In the intervals between the flow of blood a flow of serous fluid takes place, caused by irritation of the distended mucous membrane.

The causes of hemorrhage are more particularly treated of by Duncan². He very properly calls attention to the fact that the tumor in itself is an irritant, causing increased congestion, and by its pressure, like every other tumor, being the means of impeding circulation. Furthermore, the menstruating or bleeding surface is increased by the enlargement of the uterine cavity, and the contractions which the tumor calls forth likewise produce hemorrhage by the violence they do to the mucous membrane. A partial hyperæmia, caused by impeded circulation, likewise takes place when the extremity of the fibroid reaches into the distended internal or external os uteri, inasmuch as this extremity is not exposed to the uniform pressure by the uterine walls to which the rest of the tumor is subjected.

¹ Edinburgh Med. Journ., January, 1874, p. 581.

² Edinburgh Med. Journ., January and February, 1867, p. 630.

However important all these influences may be, the most prominent cause, after all, is still the great distention of the mucous membrane by the tumor, in consequence of which the veins become enlarged, while their walls are made thinner and are more easily torn.

Submucous fibroids are very liable to be accompanied by dysmenorrhœa, which sometimes (fortunately not often) reaches an enormous degree. It depends upon the fact that the tumor, diminishing the cavity of the uterus, offers a mechanical obstacle to the escape of the menstrual fluid.

For the same reason sterility usually exists, the occurrence of pregnancy being extremely rare.

When they attain a considerable size, then, submucous fibroids present the same manifestations as those which are subserous, the circumstance that, in the former case, the abdominal tumor is composed of the enlarged womb itself, not making any material difference.

The shape of the uterus is materially modified. As its cavity is pretty uniformly distended, and its walls become hypertrophied in the same manner, the organ assumes a strikingly round form. Even during their earlier history, submucous fibroids usually lead to such complete obliteration of the cervix, that, even while the external os remains closed, the cervix and body constitute but one cavity (see Fig. 88).

At the climacteric period the disturbances grow less and may even entirely disappear; still, menstruation may often persist long, continuing after the age of fifty.

Interstitial fibroids sometimes act more like subserous and again more like submucous tumors. The very little ones, if situated in the anterior wall, produce anteflexion of the uterus, and if in the posterior wall, retroflexion; as they become larger, however, a tumor situated in the anterior wall may induce retroflexion of the organ. The more these tumors encroach upon the uterine cavity, the sooner will there be blennorrhœa and hemorrhage. These conditions will both be particularly well developed if several growths have combined to lengthen and distort the uterine cavity. Under these circumstances the most violent dysmenorrhœa may arise. Partly by these means, and partly by dislocations or narrowing, that is, closure of the tubes, the

meeting of sperm and ovum may be prevented, so that, here too, sterility is common.

These tumors grow more rapidly than any other kind of fibroids, and may attain a colossal size. They will then, by their extent and weight, produce the same train of disturbances described above.

If the tumor projects chiefly into the cavity of the uterus, this organ may be pretty uniformly enlarged. Very commonly, however, these growths project outward as well as inward, especially if they are multiple, giving the most singular shapes to the exterior of the uterus and the most extraordinary irregularities to its cavity.

Cervical fibroids are not so frequently accompanied by severe hemorrhage, but are regularly associated with catarrh of the cervical mucous membrane. Dysmenorrhœa and sterility usually exist, because the tumor blocks up the cervical canal.

The *termination* of fibroid tumors, in the great majority of cases, consists in an arrest of growth. This arrest may even take place very early, especially in subserous fibroids. It is not an uncommon thing to find these little subperitoneal fibroids, about the size of a walnut, when making post-mortems, or in gynecological examinations for other purposes, or even in the examination of pregnant women.

But even when the fibroid continues to grow, and gives rise to serious symptoms, this growth is ordinarily very slow, and is likely to terminate at the menopause, or even to recede from that time. Excepting the fibro-cystic variety, it is rare for these tumors to progress uninterruptedly in their growth and threaten life, as is so common with ovarian tumors.

There can be no doubt that the recession, and even the complete disappearance of these growths, is observed. In making this statement, it is true, we practically regard all such tumors as having disappeared, which cannot be found on the most careful combined manipulation, even though anatomical search may subsequently reveal some cicatricial remains of connective tissue. Quite an array of instances of the complete, or almost complete, disappearance of fibroid tumors may be found in literature, in some of which the diagnosis may appear a little

doubtful, but in the majority of which its correctness may be regarded as beyond question.

Such cases are reported by McClintock (Clin. Mem. on Diseases of Women, Dublin, 1863, p. 141), J. Clarke (Transact. of a Soc. for the Imp. of Med. and Surg. Knowl., 1812, Vol. III.), Rigby, Ashwell (Lancet, Feb., 1854, four cases), M. Duncan (Edin. Med. Journ., Jan., 1867), Playfair (Lond. Obstet. Tr., Vol. X., p. 102), Brunton (ibid., Vol. XIII., p. 282), Kidd (Dublin Journ. Med. Sc., Vol. 54, 1872, p. 133), Simpson (Dis. of Women, Edin., 1872, p. 693), Goodell (Phil. Medical Times, June 1, 1872, p. 323, two cases), Guéniot (Bull. de Thérap., 1872), Depaul (two cases), Herpin, Béhier (ibid.), Cazeaux (Bull. de la Soc. de Chir., 1857, p. 94), Courty (Traité Prat. des Mal. de l'utérus, 2d ed., p. 953), Velpeau (Schmidt's Jahrb., B. 151, p. 296), Péan (Gaz. des hôp., Nov. and Dec., 1871), Hildebrandt (Berl. kl. W., 1872, No. 25), Routh (l. c., two cases), G. Braun (Wien. Med. W., 1868, Nos. 100 and 101; disappearance of a very large fibroid, under suppuration). Boinet (Gaz. hebdom., 1873, No. 18) is also convinced of the correctness of his diagnosis in three cases. Sedgwick (St. Thomas' Hosp. Rep., 1870, Case I.), Scanzoni (Lehrb. d. weibl., Sex., 4 Aufl., Bd. I., p. 252), Gassmann (Würtemb. med. Corresp.-Blatt, 1868, No. 19), and Kidd (Dublin Journ. of Med. Sc., Vol. 54, 1872, p. 144) saw fibroids disappear during the puerperal period. In one case, in which a woman was delivered of her fifth child, at seven months, suffering from severe hemorrhage, I was sure that I felt two moderately large interstitial tumors (the imprint of one of them could be distinctly seen on the placenta which had grown over it). Six weeks later no trace of these was to be found. Madge (Lond. Obst. Trans., XIV., p. 227), in a case presenting eight fibroids, saw several of them disappear entirely within a few months after labor, and others diminish in size.

Here, then, are thirty-six cases, in which the disappearance of fibroids is pretty positively established. If we inquire under what circumstances and by what means their absorption was accomplished, we shall receive no very satisfactory answer. Seeing that fibroids, as a whole, exhibit the same structure as the normal uterine parenchyma, and as during the puerperal period this tissue undergoes an almost complete process of physiological absorption, one would conclude, *à priori*, that the fibroids, too, would be most readily absorbed during the same period. This, however, is not fully confirmed by experience, as only six puerperal cases are found among the thirty-six reported. A more important influence seems to be exerted by the occurrence of the menopause, and yet there are not a few younger women embraced in the above list. The most unreliable results seem to follow therapeutic interference. It is true that in very many

of the above cases the women were under the treatment of physicians. But whether the medicines administered contributed to the result, appears, in the great majority of cases, highly problematic.

The experience given above does, however, positively establish the fact that even very large fibroids may entirely disappear (most readily after the menopause), even though this termination is quite rare, in proportion to the frequency of their occurrence, and although we cannot bring therapeutic means to bear upon them with any degree of certainty.

A complete cure (partial recovery by calcareous degeneration of the tumor has been spoken of above) may also take place in another way, viz., by the expulsion of the tumor.

This process of *expulsion* is either an enucleation, whereby the tumor is, to a certain degree, turned out of the bed of overlying mucous membrane in which it rests, or the coverings of the tumor become inflamed and suppurate, and the tumor, having been deprived of its nourishment and become gangrenous, is cast off.

The process of *spontaneous enucleation* is, of course, a far milder one than that last referred to. It occurs most frequently in the submucous fibroids, but may also be met with amongst those that are interstitial. The mucous membrane becomes torn at the point where its extremity lies within the os, or it is worn off, or becomes gangrenous through pressure, and when an opening has thus been effected the mucous membrane draws itself back over the tumor, and thus uncovers an ever-increasing portion of the same. Contractions of the uterus, then, drive the fibroid completely into the vagina, and thence outward.

This process, however, is often a dangerous one, inasmuch as *the whole bed of the tumor may suppurate*, and the tumor, being deprived of its nourishment, may become gangrenous. Even under these circumstances expulsion and complete recovery may be accomplished; in other cases, however, death may ensue from peritonitis or pyæmia.

Instances of expulsion of fibroids, either unchanged or gangrenous, whole or in pieces, are reported by Pinault (Bull. de la soc. anat., 1828), Marchal de Calvi, (Annales de la chir. franç. et étrang., 1843, II., p. 385), Barth (Bull. de la soc.

anatomique, 1850, p. 82), Willaume (*Archives gén.*, XXIV., p. 249), Bernutz (*Gaz. hebdom.*, 1866, p. 763), Depaul (*Soc. de chir.*, 27 Mai, 1868), McClintock (l. c., Cases I., II., III., IV., VI., VII.), Baker-Brown (*Lond. Obst. Trans.*, Vol., I., p. 330), Sedgwick (*St. Thomas's Hosp. Rep.*, 1870, Case II.), Hardie (*Med. Times*, July 6th, 1872), Whiteford (*Glasgow Med. Journal*, May, 1872), Ziemssen (*Virchow's Archiv*, 1859, Bd. 17, p. 340), Lumpe (*Zeitschr. d. Ges. d. Wiener Aerzte*, 1860, No. 29; suppuration after the loss of chalky concretions), Chiari (*Klin. d. Geb. u. Gyn.*, pp. 402 and 403), Freund (*Bresl. klin. Beitr.*, II. 3, p. 143 and 147), Küchenmeister (*Oesterr. Z. f. pr. Heilk.*, 1869, No. 31), Roloff (*Diss. Inaug. Greifswald*, 1873), Säxinger (l. c., p. 111), Kristeller (*Berl. klin. Woch.*, 1872, No. 35), Schneider, *Corresp.-Blatt schweiz. Aerzte*, 1872, No. 16), Fredet (*Annales de la soc. de med. de St. Etienne*, 1865, p. 205); the tumor, which was mistaken by the midwife for a child's head, and by the physician for the breech, was seized with forceps and drawn out of the vagina.

In exceptional cases a fibroid tumor may lead to perforation into other organs, causing destruction or gangrene of the intervening parts by pressure. Undoubtedly, as is claimed by Larcher,¹ such perforation is often completed by means of uterine contractions.

Perforation into the abdominal cavity, with fatal results, may take place, as is shown in the following cases: Viardin-Fourcade-Cruveilhier, (*Bull. de la soc. anat. de Paris*, 1834, T. IX., p. 43), Maslieurat-Lagémart (c. l., 1836), Balard (*Province. Med. and Surg. J.*, June, 1849), R. Lee (*Medico-chir. Tr.*, London, 1855, IX., 94), Maisonneuve (*Mém. de la soc. de chir.*, 1851, p. 267), Huguier (c. l., 1857, VIII., p. 92), Jarjavay (see Guyon, *Des tum. fibr. de l'utérus*. Paris, 1860, p. 65), Larcher (l. c., p. 548), Hecker (*Klin. d. Geb.* II., p. 133), Demarquay (*Soc. de chir. de Paris*, 22 Juin, 1859; perforation of the anterior and posterior uterine walls. In front, adhesion to and perforation into the bladder,—behind, an opening into Douglas's space with fatal peritonitis).

The case of Demarquay, with perforation into the bladder, is very similar to those of Lisfranc (see Th. S. Lee, l. c., p. 67) and Fleming (see McClintock, l. c., p. 27): "A calcareous fibroid, which arose from the anterior wall of the uterus, had forced its way into the bladder, by ulceration, and produced the worst symptoms of stone in the bladder."

The inflamed tumor may also perforate through the anterior abdominal wall. Loir (*Mém. de la soc. de chir. de Paris*, 1851, T. II.), saw a gangrenous polypus work its way, by suppuration, through the anterior uterine wall and the linea alba. Dumesnil (*Gaz. des hôp.*, 1869, No. 6) observed quite a peculiar case, in which a tumor, which had broken through the anterior abdominal wall, grew in the form of a cone. The entire growth afterwards fell off spontaneously, the wound healed, and the woman recovered, a tumor as large as a fist remaining under the cicatrix.

¹ *Arch. génér.*, 1867, 2, pp. 545 and 697.

Diagnosis.

Subserous fibroids can rarely elude a search made by careful conjoined manipulation, as the tumor is usually felt, whether pedunculated or attached to the uterus by a broad base.

Quite small tumors, up to the size of a walnut, if distinctly felt, can hardly be mistaken for anything else.

If the fibroid is of about the size of the normal uterus, and rises by a broad base from the region of the internal os, lying either in front or behind, it may by mere vaginal examination very easily be mistaken for a retroflexed or ante flexed uterus. On more careful combined examination, however, the uterus may be felt in its usual position, or but slightly displaced. Still, under these circumstances, the question may arise as to which of the two tumors is the uterus. As a rule, this can be determined by the somewhat deviating form of the fibroid; the consistence of the two also usually varies—the fibroid being harder, the uterus softer. Should a doubt still remain, it can be settled by the sound.

If the tumor is still larger, it may be confounded with quite an array of other conditions. This is particularly easy if it is held fast in Douglas's space by peritoneal adhesions. It may then bear a close resemblance to intraperitoneal exudation, or to retro-uterine hæmatocele. But the two latter are irregular in shape, they are not so round, and lie in full and firm contact with the pelvic walls. A fibroid tumor embedded in an exudation may, it is true, present features which render it impossible to distinguish it from an old, thickened exudation. Fresh exudations, however, as well as hæmatocele, are softer, or at least more elastic, and present characteristic peculiarities as to their early history and subsequent course.

An ovarian tumor may be bound down in Douglas's space in just the same way as a fibroid. As the former is almost always composed of cysts, its consistency is less firm; still, this sign may be shrouded by the presence of an exudation, and in exceptional cases the fibroid itself might be quite soft. If it seems of urgent importance to establish the differential diagnosis, this

may be accomplished by an exploratory puncture with a small trocar, or, better yet, by the use of the aspirator.

But it is not under these circumstances alone that ovarian and fibroid tumors may be mistaken for one another; the chances of error become greater when the tumors are very large. In general, ovarian tumors are not so intimately connected with the uterus, though they may, exceptionally, be bound closely thereto by peritoneal adhesions. Although ovarian cysts are characterized by their elasticity and fluctuation, yet once in a while we may have to deal with a solid ovarian tumor; and, on the other hand, fibroids may become soft by œdema, fatty degeneration, and especially cyst-formation. It may therefore prove impossible to determine the diagnosis between an ovarian tumor, held fast to the uterus, and a subserous fibroid with a narrow pedicle, or a large fibro-cystic tumor. Indeed, it is sometimes a matter of great difficulty, even on the dead body, positively to establish the point of origin of the growth. We shall return to this question again under the head of ovarian cysts.

Interstitial fibroids, if they are quite small, may be difficult of recognition. They may be diagnosticated when the uterus can be felt to be thickened, and when palpation or the use of the sound determines the fact that this thickening is partial; that it only involves one wall, while the other is thin and relaxed—such a marked contrast occurring only when one wall is the seat of a fibroid. Sometimes the way in which the hardness of the fibroid stands in relief against the soft and relaxed state of the uterine wall is exceedingly striking, so that then even quite small fibroids can be recognized with certainty.

When tumors of this class grow larger, they usually cause irregularities in the external shape of the uterus. If it is possible, as it usually is, to prove that the tumor is composed of the enlarged womb itself, it is difficult to refer the hard, irregular growth to any other cause than the right one. If the interstitial fibroid is very large, and especially if the cervix lies far back and high up, it may be very hard to decide whether the uterus itself is enlarged, or whether it lies behind a large tumor; still, in cases of fibroid, the uterine sound usually shows decided lengthening and distortion of the uterine cavity.

It is true, however, that in cases of large ovarian cysts, which are most likely to be confounded with the condition we are now studying, the womb may also be drawn out beyond its normal length. If the matter remains in doubt, and the body of the womb is so drawn up and back that it cannot be reached by the usual methods, Simon's plan of rectal palpation, with the whole or half of the hand, often settles it at once.

In those rare cases in which an interstitial fibroid has not altered the external contour of the uterus, or at least has not so materially altered it but that it can be recognized with certainty on combined manipulation, great difficulty may be experienced in making a differential diagnosis between this and other conditions, which likewise produce uniform thickening of the organ. The subjects of hæmatometra and hydrometra will be considered again when treating of the diagnosis of submucous fibroids, with which these are much more likely to be confounded. Aside from them, the greatest difficulty will arise in differentiating between interstitial fibroids and chronic metritis or pregnancy. In chronic metritis the uterus is flatter, and at the same time tender to the touch; in fibroids, it is round and not tender, as long as no inflammatory complications exist. Examination with the sound, too, may furnish valuable information; in metritis, the sound readily passes up through the middle of the enlarged organ; in fibroids it passes with difficulty, and to one side of the centre.

These tumors may be distinguished from normal pregnancy without trouble, even during the first half of the period, by the history, the consistency of the tumor, and the difference in the vaginal portion of the uterus, which is soft and spongy in pregnancy, but hard in fibroids. Great confusion may arise in case of pregnancy with death of the embryo and degeneration of the ovum. Here, too, the sound passes the internal os with difficulty, and then turns to one side, continuing its way up between the ovum and the uterine wall. The uterus may be quite hard, though it is usually softer and flattened from before backward. The history of the case may leave us completely in the dark. In such a case, which fell into my hands, and in which the history pointed strongly to retention of a blighted ovum, no alter-

native was left but to dilate the cervix with sponge-tents, and pass the finger into the uterus, whereupon it came into immediate contact with a fibroid (see Fig. 90) pushing inward through the left wall.

The uterine *bruit* is of no great significance as affecting the differential diagnosis, as it is almost always present in pregnancy, and not rare in case of fibroid tumors, occurring also very exceptionally in ovarian tumors.

As regards diagnosis, *submucous fibroids* are to be put in the same category with those interstitial growths which enlarge the uterus uniformly, and may therefore easily be confounded with chronic metritis and pregnancy. But they possess one characteristic peculiarity, which is wanting in the two conditions just named, viz., that they soon cause a disappearance of the cervix, so that the tumor may be felt immediately above the external os. The various tests noted above likewise retain their significance. Submucous fibroids are most likely to be confounded with atresia of the external os, with consecutive hæmatometra, as in this case, too, there is a disappearance of the cervical canal. But, as a rule, the history of the case, as well as careful sounding, will suffice to establish the distinction; and furthermore, the fulness and tension are never so great in fibroid tumors (though it may be in malignant growths) as they uniformly are in hæmatometra.

It frequently happens with these submucous fibroids, that the cervix is sufficiently dilated to permit the passage of the finger, so that the tumor may be directly felt; and if this dilatation is not constant, it is at least likely to occur during the menstrual period. This last circumstance is of great diagnostic importance, and should lead us, in all such cases, to make an examination during the menstrual flow.

Fibroids of the cervix are usually easy of recognition, as the distention of one lip by a round, hard tumor is characteristic, and can hardly be mistaken.

Prognosis.

Although, fortunately, it is but seldom that fibroid tumors reach such a size as directly to endanger life, yet this does hap-

pen now and then; sometimes, too, they may prove fatal in other ways, especially through hemorrhage, or through suppuration and ichorous degeneration. Usually, however, owing to the fact that these tumors are seldom radically cured, they constitute a life-long malady, not directly threatening life, but greatly interfering with its enjoyment, and sometimes seriously impairing the vital powers.

A partial cure may take place spontaneously, through an arrest in growth or material diminution in size, the result of induration or calcareous degeneration. In very rare instances a radical cure has been effected through absorption or elimination of the tumor outwards.

Treatment.

Inasmuch as the causes which operate in the production of uterine fibroids are entirely unknown, we can, of course, institute no rational prophylactic treatment.

When a myoma has developed itself in the uterus, the first question for the practitioner to consider is, whether he shall confine himself to the treatment of the most urgent symptoms or aim at the removal of the tumor.

In order to obtain a general view of the question, we will first consider the possibility of a radical cure and the various methods of attempting it.

Although there is some opposition to this view, we may consider it as well established that fibroid tumors may entirely disappear spontaneously, therefore, of course, also under treatment (see page 241). But almost all are agreed that the influence of treatment in these cases is very problematic.¹ The remedies most employed are iodine, iodide of potassium, bromide of potassium, chloride of calcium (especially by the English, who believe that it produces an atheromatous degeneration of the vessels), and ergot. Guéniot² recommends arsenic and phosphorus for the purpose of inducing fatty degeneration. Although, in some of the instances given above, the influence of

¹ See the Brit. Med. Journ., 1871, p. 536, for a collection of the views of many of the most noted English gynecologists.

² Medical Times, March 23d, 1872.

treatment cannot be disproved (we refer, above all, to the case of Hildebrandt), and although we may construct rational theories with regard to the method of this influence, yet, on the other hand, we should distinctly remember that all the means recommended usually fail, and that we have no internal treatment from which, in any individual case, we are justified in expecting good results, with the least degree of certainty.

At the same time, the experiences of the past, especially Hildebrandt's observations on the *hypodermic use of ergotine*, should incite us to further attempts in this direction. Instead of Langenbeck's alcoholic solution (thirty-eight grains of aqueous extract of ergot to two drachms each of dilute alcohol and glycerine), Hildebrandt uses the following: aqueous extract of ergot, forty-six grains; glycerine and distilled water, each two drachms. He claims that the use of this solution, if the injections are made deep enough, is less liable to be followed by local trouble. A simple watery solution, equal parts of the aqueous extract of ergot and water, or one part of the former to two of the latter, may also be used, and a quarter or half a syringe-ful be injected at a time. Swiderski¹ recommends the following four solutions:

	1.	2.	3.	4.
Aqueous extract of ergot. .	38 grains.	31 grains.	38 grains.	15 grains.
Alcohol.....	139 minims.	92 minims.	46 minims.	27 minims.
Glycerine.....	92 “	123 “	154 “	37 “
Distilled water.....				68 “

Injectations of ergotine have this unpleasant feature, that they are very painful, and cause a prolonged induration, or even abscess, at the site of puncture. According to Wernich, these disagreeable effects are less likely to follow the use of the extract of ergot of the German Pharmacopœia, which may be best employed in the form of a pure ten per cent. solution. Wernich² obtained a pure and very effective preparation, which caused scarcely any pain, and was rapidly absorbed, by taking powdered ergot, after it had been freed from fatty matters and

¹ Berl. klin. W., 1870, Nos. 50 u. 51.

² Berl. klin. W., 1874, No. 13, and Berl. Beitr. z. Geb. u. Gyn., B. III., H. 1, p. 71.

those soluble in alcohol, extracting it with water, and then cleansing it from its mucilage and other impurities by filtering. This method, however, is tedious and troublesome, and the preparation, therefore, expensive.

As yet, nothing very favorable has been reported with regard to the radical cure of fibroids by these injections. Bengelsdorf¹ reports doubtful results (better ones in chronic metritis). Keating and Ashhurst² have had comparatively good results, and some favorable cases have also been reported to the Philadelphia Obstetrical Society,³ as well as by Goodell in his report to the Pennsylvania Medical Society on the progress of obstetrics and gynecology, 1873, p. 24.

Electricity has also been employed to cause the absorption of fibroids.

The radical removal of these growths may be accomplished, much more surely than by all these methods, in appropriate cases, through operative interference, although this is not unaccompanied with considerable danger.

Uterine fibroids may be reached in two ways, either through the vagina and cervix, or through the abdominal walls, by laparotomy. The first method is applicable to submucous tumors, the second to those that are subperitoneal; the interstitial variety have been attacked in both ways, either by attempts to enucleate them from within, and remove them through the vagina, or, having opened the abdominal cavity, to amputate the entire uterus with its new formations.

The Removal of Fibroids through the Vagina.

Amussat, Mém. sur l'anatom. pathol. des tumeurs fib., etc., 1842.—*Atlee*, Amer. Journ. of Med. Sc., Apl., 1845, and Oct., 1856.—*Hutchinson*, Med. Times, 1857, July and Aug.—*Langenbeck*, Deutsche Klin., 1859, No. 1.—*M. Duncan*, Edinburgh Med. Journ., Jan. and Feb., 1867.—*Gusserow*, Mon. f. Geb., B. 32, p. 83.—*J. M. Sims*, loc. cit., pp. 90 et seq.—*Thomas*, Amer. J. of Obst., V., pp. 104 and 474.—*Meadows*, Amer. J. of Obst., V., p. 241, and Obst. J. Gt. Bt., I., p. 34.

¹ Berl. klin. W., 1874, No. 2.

² Amer. Jour. Med. Sc., July, 1873, pp. 131 and 138.

³ Amer. Journ. of Obst., VI., p. 639.

Enucleation through the vagina, after having been proposed by Velpeau, was first carried into effect by Amussat in 1840. In general, it is only applicable to submucous fibroids, at least it is only very exceptionally so to those that are interstitial.

The operation is divided into several steps. First of all, the os uteri must be dilated as widely as possible. If the cervix is obliterated, this enlargement may be most readily accomplished by an incision; if it is preserved, dilatation by the sponge-tent may be employed, as extended lateral incisions through the entire length of the cervix, to the internal os, are decidedly dangerous. When one or more fingers can be introduced through the cervix to the tumor, a longitudinal or crucial incision into the mucous membrane of the tumor is to be made, and the same separated from the tumor as widely as possible by the finger. The detached end of the tumor is now to be firmly seized with the vulsellum forceps, and forcibly drawn down, while the finger endeavors still further to detach it from its bed. If it has come down far, and passed through the dilated os, the last adhesions may be severed by the finger, the handle of the scalpel, curved scissors, or the knife.

Great difficulties may arise if very considerable tumors, which have passed through the os into the vagina, show signs of strangulation within the true pelvis. Scarcely any alternative remains but to remove as much of the tumor as possible with the *écraseur* or the galvano-caustic wire loop, or by the knife and scissors. If this operation, which is certainly quite hazardous, is well borne, the cut surface soon shrivels up, and the tumor may disappear.¹

The enucleation of interstitial fibroids is far more dangerous than that of the submucous, because the tumor is more difficult to reach, and because one cannot tell how near, or over what extent, it reaches to the peritoneum. The operation should, therefore, only be undertaken under favorable circumstances, that is, when the cervix is obliterated and the external os is open, or its edges sharp, when the tumor does not protrude outwards into the abdominal cavity, and when symptoms arise

¹ *Spiegelberg*, Arch. f. Gyn., V., p. 100, and *P. Müller*, e. l., VI., p. 125.

directly threatening life. It will be found best, then, according to the suggestion of Duncan, to undertake the enucleation of the tumor by various means, only, to a certain extent, inaugurating and assisting the efforts of nature to expel the growth. The os uteri is first incised some time after the capsule is split and, as far as possible, detached from the tumor. By the internal administration of ergot, and attempts at extraction, nature is aided in the gradual removal of the tumor thus loosened. If, however, the removal of its mucous covering causes gangrene of the fibroid, its extirpation must be speedily completed.

It must never be forgotten that the operation is accompanied with great danger, so much so that Thomas, who is a decided advocate of the same, declares it to be more dangerous than ovariectomy; it is certainly more difficult. According to him, the operation is practicable only if the cervical canal is enlarged, and if either the uterus is so greatly displaced downwards that the os appears at the mouth of the vagina, or else the vagina admits the entire hand; therefore, in effect, only in women who have borne children. A considerable number of those operated upon die of pyæmia or septicæmia.¹ Sometimes it is found impossible to complete the operation, as the tumor cannot be separated from the uterus; this condition of things is, of course, extremely dangerous, if not absolutely fatal.

If the enucleated fibroids are of very considerable size, their passage through the vagina may be a matter of some difficulty. Under these circumstances the obstetrical forceps may be of great service, being applied to the tumor as to the head of a child. Lateral incisions, to enlarge the outlet of the vagina, as in labor, may also be required.

Cervical fibroids, being the most accessible, are the best adapted for enucleation.

In rare instances a radical cure is effected by incising the capsule and detaching it from the tumor, or even by merely incising it, the tumor being then enucleated by the powers of

¹ *Hegar*, Virchow's Archiv, B. 48, p. 332; *Brown*, Phila. Med. and Surg. Rep., 1871, No. 25; and *Emmet*, Amer. Jour. of Obst., IV., p. 725. In the latter case the tumor also projected outwards, and the autopsy showed that by its removal a hole had been left in the uterine wall, covered only by peritoneum.

nature, or, if it become gangrenous, being expelled. For this purpose Baker-Brown¹ has cut large pieces out of the fibroid.

The Removal of Fibroids by Laparotom

Korberlé, Gaz. med. de Strasbourg, 1864; and Documents p. servir à l'hist. de l'existence des tum. fibr., etc. Strasbourg, 1865; and Oper. d'ovariotomie. Paris, 1865, p. 98.—*Storer*, Successful Removal of the Uterus and both Ovaries. Boston, 1866.—*Caternault*, Essai sur la gastrotomie dans les cas, etc. Paris, 1866.—*Boinet*, Gaz. hebdom., 1873, Nos. 8, 13, 18, 19, 23, 28, 29.—*Péan et Urdy*, Hysterotomie, etc. Paris, 1873.

The most favorable cases for laparotomy are those in which the fibroid is attached to the uterus by a well-developed narrow pedicle, in other words, cases of pure subserous fibroids. An incision is then made through the abdominal wall, the tumor is turned out through the opening, and the pedicle is treated according to the rules adopted in ovariectomy. The operation would not seem to be any more dangerous than that of ovariectomy.

But, unfortunately, pedunculated subserous fibroids seldom call for the operation, because their growth, as a rule, is quite limited. Gastrotomy is more frequently indicated in those subserous tumors that have a broad base of attachment, or in the interstitial fibroids, and most frequently demanded by the fibrocystic tumors, whose growth is exceedingly rapid. In all these varieties the operation is much more difficult and dangerous, because the tumor must either be detached from the uterus over a large surface, or the uterus and its appendages, in whole or in part, must be removed at the same time.

In performing the operation, the abdominal cavity is opened by a long incision through the linea alba, then the size of the tumor is diminished as far as practicable by puncture of any cysts that may be present, and it is drawn out through the opening. Its connection is now severed at the narrowest point—in interstitial fibroids usually in the neighborhood of the internal os,—all necessary precautions being observed, as in ovariectomy, and the pedicle being variously treated, that is, being either

¹ Obst. Trans., III., p. 67, and Surg. Dis. of Women, 3d ed., 1866, p. 240.

included in the lower angle of the wound, or returned into the cavity of the abdomen ligated or cauterized.

Heath and Charles Clay, in Manchester, were doubtless the first who removed uterine fibroids by laparotomy, in 1843 and 1844. Both patients died. An American, by the name of Burnham, achieved the first recovery, in 1853. Since that time the operation has been performed pretty frequently, sometimes intentionally, and sometimes under a mistaken diagnosis, the tumor being considered ovarian.

Boinet collects the following operations:

Among 42 laparotomies, with removal of the uterus, 32 deaths and 10 recoveries.

Among 23 operations, with simple removal of the tumor, 15 deaths and 8 recoveries.

The last 23 may be divided as follows: 13 in which the tumor was pedunculated, giving 5 deaths and 8 recoveries; 10 of interstitial tumors or of tumors with a broad base, giving 10 deaths.

Among 14 cases of laparotomy which were abandoned, unfinished, we have 5 deaths and 9 recoveries.

Boinet, therefore, comes to the conclusion that laparotomy is justified, in uterine fibroids, only when the tumor is pedunculated. Demarquay endorses these conclusions in his notice of Boinet's work, given to the session of the Acad. de Méd. of the 29th of October, 1872.

By the addition of new cases we arrive at the following statistics:

Among 108 laparotomies for uterine fibroids there were 78 deaths and 30 recoveries ($27\frac{8}{10}$ per cent.). Of these, 73 operations, with removal of the uterus, gave 55 deaths and 18 recoveries ($24\frac{6}{10}$ per cent.); while 35 operations, without removal of the uterus, gave 23 deaths and 12 recoveries ($34\frac{3}{10}$ per cent.).

According to these results, we must certainly thus far coincide with Boinet's verdict that in the case of non-pedunculated fibroids, at all events, we should only undertake an amputation, if very urgently indicated. Péan, however, even under these circumstances, reports 8 cases with 6 recoveries.

Symptomatic Treatment.

The symptoms dependent on an increase in size are:

1st. The same annoyances which all other large abdominal tumors cause by their weight and pressure on neighboring organs. These annoyances cannot be done away with otherwise than by the radical cure of the tumor, and they can be relieved only to a very slight degree. As a rule, we may be well content if we can prevent these symptoms from growing worse, by arresting the progress of the growth. Even this only succeeds occasionally,—still, it should be tried.

It is of the greatest importance to remove all influences which induce an increased supply of blood to the genitals. Abstinence from, or at least restriction of, sexual intercourse is therefore imperatively demanded. As this can very seldom be attained while married people live together, it is doubly desirable to send women away to visit the baths.

The blood-supply is also somewhat diminished, and the nourishment of the neoplasm therefore interfered with, by the frequent abstraction of blood through scarification. Cold cannot very well be applied as continuously as would be necessary in order to prove effective.

The internal remedies to which has been ascribed the power of influencing the absorption of fibroids, such as iodine, bromine, and chloride of calcium, deserve but little confidence. It is of decided benefit to let patients make use of those baths which promote absorption. Amongst these may be reckoned waters containing carbonic acid, saline baths, and probably also mud-baths. The best, however, are the saline waters, containing iodine or bromine, therefore Kreuznach,¹ Münster on the Stein, Adelheidsquelle and Krankenheil, near Tölz, Sodenthal, near Aschaffenburg, Hall, in Upper Austria, etc.

Of late, injections of ergotine have claimed special attention as a means of reducing the size of fibroids. Enough has been said on this subject, however, in a previous section.

2d. If the tumor lies in the true pelvis, symptoms of pressure on the other organs occupying that cavity, especially the bladder and rectum, will appear. These cases often improve quite materially if the tumor is pushed up into the false pelvis. The worst cases, in which the symptoms of compression are most urgent, and in which, therefore, the tumor is very large for the true pelvis, are the very ones in which it stays up, and the symptoms, which up to that time have been quite severe, are suddenly relieved.

3d. In such narrowing and distortion of the uterine cavity, as gives rise to uterine colic of the most painful description. In such cases it is but rarely that relief can be given by effecting a

¹ *Prieger*, Mon. f. Geburtsh., B. I., pp. 183 and 241, and *Michels*, Die chron. Frauenkrankh., etc., im Bade Kreuznach. Berlin, 1869.

change in the position of the tumor. Usually we are confined to the symptomatic treatment of the dysmenorrhœa.

The symptom which most frequently and urgently demands relief is the hemorrhage, which is always greatest during the menstrual period, and is, therefore, a menorrhagia. Rest in the recumbent posture often fails to diminish the flow. In many cases a slight scarification, shortly before the menstrual period, is very effective in moderating the menstrual hyperæmia. The most important internal remedy is ergot, which may be given with very good success in the form of powder, eight grains every hour or two hours, or in decoction or infusion (from half a drachm to one and a half drachms of ergot in three fluid ounces of water), or injected subcutaneously in the form of ergotine (see page 250). The solution of chloride of iron, tannin, and other astringents may also be given internally.

On the other hand, narcotics are also recommended by many to control hemorrhage; their mode of action doubtless being that, by paralyzing uterine contraction, they prevent the distortion and violence otherwise done to the mucous membrane, and the rupture of vessels which follows. (This appears to be in opposition to the recognized efficacy of ergot; still, a case will sometimes arise where ergot seems to increase hemorrhage, and then the drug doubtless acts more by producing contractions of the walls of blood-vessels, and perhaps, also, sometimes by virtue of the fact that strong contractions of the uterine muscular tissue compress the bleeding mucous membrane). Opium, and more particularly tincture of Indian hemp, have achieved a high reputation under these circumstances.

If we wish to secure the immediate arrest of a considerable hemorrhage, we may tampon the vagina. This, however, is purely symptomatic treatment, and is of no benefit for the future. Therefore the use of the sponge-tent is to be preferred, which also securely stops the hemorrhage, and likewise frequently diminishes its future violence, as well as occasionally operating in a strikingly favorable manner upon all the symptoms.

Still more decided measures against hemorrhage may be adopted by the use of intra-uterine injections, which should be

employed with all the precautions previously enjoined. Savage¹ injects the following solution, *after dilatation of the cervical canal*:

Iodine.....	68 grains.
Iodide of potassium.....	116 “
Alcohol.....	18 fluid drachms
Distilled water.....	6 fluid ounces.

or, also, the pure tincture of iodine. He, as well as Sims and G. Braun, have seen very good results from this. According to the latter,² adhesions take place between the two mucous surfaces. At all events, this iodine solution is to be preferred to that of chloride of iron, recommended by Routh and M. Duncan,³ because the latter causes the formation of blood-clots which must be expelled with pain. Kidd⁴ refers to a case of fatal metritis after the injection of the chloride of iron.

A very simple, quite safe method, and one which is often effectual against hemorrhage for a long time, consists in incisions of the os uteri, or—what is far safer—of the mucous membrane covering the tumor. Atlee⁵ and B. Brown,⁶ have recommended this. The mouth of the uterus being dilated, and the enlarged organ being pressed downwards by an assistant, a bistoury—the lower part of which is guarded by having something wound about it—is introduced through the cervix, and as high as possible over the tumor, and as it is withdrawn a longitudinal incision, not too superficial, is made into the surface of the tumor. The hemorrhage following the incision is very moderate, and the metrorrhagia is often quieted for a time. The efficacy of this method evidently depends on the fact that the distended veins lying in the mucous membrane over the fibroid, and which cause the profuse hemorrhages, retract and are obliterated by thrombi after the incision, and the tension of the distended mucous membrane is lessened.⁷

¹ *Sims*, l. c., p. 120.

² *Wien. med. Wochenschr.*, 1868, Nos. 100 and 101.

³ *Med. Times*, 11th Feb., 1871, p. 158.

⁴ *L. c.*, p. 137.

⁵ *Transact. Amer. Med. Assn.*, 1853, p. 558.

⁶ *L. c.*, p. 243.

⁷ *Spiegelberg*, *Monatsschr. f. Geb.*, B. 29, p. 87.

FIBROUS POLYPI.

Aside from the literature referred to, under the head of fibroids, the following works may be mentioned: *Levet*, Observ. sur la cure radic. de plusieurs polypes de la matrice. Paris, 1771.—*Richter*, Anfangsgründe der Wundarzneykunst, B. 1, p. 401.—*Herbiniaux*, Traité sur divers accouch. lab. et sur les polypes de la matrice, T. II. Bruxelles, 1782.—*Nissen*, De polypis uteri. Diss. Inaug. Göttingen, 1789.—*Meissner*, Ueber d. Polypen, etc. Leipzig, 1820.—*Malgaigne*, Sur les polypes de l'utérus. Thèse. Paris, 1823.—*Gooch*, Ueber einige d. wicht. Krankh., etc. Weimar, 1830, p. 183.—*Oldham*, Guy's Hosp. Rep., April, 1844.—*Hirsch*, Ueber Histologie u. Formen der Uteruspolypen. Diss. Inaug. Giesesen, 1855.—*Dyce*, Edin. Med. J., Dec., 1867, p. 503.—*Sävvinger (Seiffert)*, Prager Viertelj., 1868, 2, p. 76.—*Baker-Brown*, Surg. Dis. of Women, 3d ed. London, 1866, p. 247.—*Scanzoni*, Sc.'s Beiträge, B. II. Würzburg, 1855, p. 94.—*Leberecht*, Ueber 40 Fälle von Gebärmutterpolypen. Diss. Inaug. Berlin, 1868.—*M. Duncan*, Edin. Med. Journ., July, 1871, p. 1.—*Hildebrandt*, Volkmann's Samml. klin. Vortr., No. 47. Leipzig, 1872.—*Madden*, Obstet. J. of Gr. Britain, Oct., 1873, p. 468.

Pathological Anatomy.

As has been explained above, fibrous polypi are nothing else than submucous fibroids which project into the cavity of the uterus and have a narrow pedicle. The etiology and the general pathological anatomy of these tumors has, therefore, already been considered under the head of fibroid tumors, so that but a few words will now suffice.

Fibrous polypi vary in size, attaining to the dimensions of a child's head and over; they almost invariably occur singly, that is, as polypi; it is not unusual to find interstitial and submucous fibroids associated with them.

Polypi, as a rule, arise from the body of the uterus, which is almost always hypertrophied; they are most frequently attached to the fundus, very rarely to the internal os or the cervix.

In the majority of instances they retain continuous connection with the parenchyma of the uterus by means of a fibroid pedicle (see Fig. 93), in which case blood-vessels always enter the substance of the polypus through the pedicle. If the pedicle atrophies, the vascular connection may still be maintained, or

the vessels may be obliterated, so that then the polypus maintains its connection with the interior of the uterine walls only by a duplicature of mucous membrane (see Fig. 94).

The mucous membrane covering the polypus may undergo secondary changes of various kinds. At one time it may be greatly thinned by the pressure of the growing polypus, so that it constitutes quite an attenuated, smooth membrane, in which



FIG. 93.

Uterine polypus whose pedicle is directly continuous with the parenchyma of the organ.



FIG. 94.

Uterine polypus without a fibrous pedicle.

the orifices of the uterine follicles appear as small openings, which may, however, be considerably enlarged if the membrane is greatly stretched.

At other times the mucous membrane is tumefied, hyperæmic, and traversed by thin-walled veins. This tumefaction may attain a high grade; the strangulated extremities of glands may undergo cystic degeneration; indeed new-growths, having their origin in these glands, may give rise to peculiar, complicated tumors, described by Rokitansky as sarcoma or cystosarcoma adenoïdes uterinum. In that case the submucous connective tissue grows rapidly and extensively, with cellular hyperplasia, and prolonged, numerous branching, utricular glands grow into this tissue. These, by strangulation, may result in a number of small cysts, of various sizes, filled with a serous, mucous, bloody, or colloid mass. A papillary growth may, however, originate in the walls of these cysts, pushing into the cavity of the glands, and it, in turn, may likewise lead to cyst-formation, so that very complicated forms of tumors may be the result.

Symptoms.

As long as polypi remain in the uterine cavity, they merely give rise, as a rule, to the same symptoms as submucous fibroids, that is, particularly, to blennorrhœa and hemorrhage. They soon dilate the internal os and thus cause the disappearance of the cervix. At a later date, the external os is also enlarged and the polypus escapes into the vagina, often very slowly, occupying several months in the process. During this gradual escape the polypus may be so tightly engirdled by the external os at some point, rarely at more than one point, that it assumes the form of an hour-glass.

This process of the opening of the cervical canal, and especially of the passage of the tumor through the external mouth, is almost always accompanied by severe pains in the back, like labor pains, which sometimes attain a very high grade. It rarely occurs quite unnoticed, and hemorrhages continue during its progress.

Sometimes general constitutional disturbances appear early, such as hysterical manifestations of the most varied kind, or derangements of digestion; the same symptoms, indeed, may arise as in early pregnancy—pigment-deposits in the linea alba and the areola of the nipple, swelling and the beginning of secretion in the breasts, also nausea and the like.

A different train of symptoms appears when the polypus, lying in the vagina, attains such a size that it acts as a large tumor, filling the true pelvis. Aside from the feeling of weight in the pelvis, and dragging downward, there are the evidences of pressure on the bladder and rectum. The first causes frequent micturition, or even incontinence; it may, however, result in the retention of urine and dilatation of the uterus, or even hydro-nephrosis. The pressure of the polypus on the nerves produces neuralgia in the lower extremities, and its pressure on the veins is followed by a varicose condition of these vessels and œdema. The vaginal mucous membrane is so irritated by the powerful distention to which it is subjected, that catarrh is a uniform result, often accompanied with copious secretion.

The further history is various. Patients may be so exhausted

by the loss of blood and other fluids that they die of marasmus. It is rare for one to succumb to an acute hemorrhage. It appears possible for an adhesive inflammation to arise between the polypus and the vaginal mucous membrane, of sufficient extent to limit the hemorrhage. In other cases inflammation, or the strangulation of the pedicle by the os, may lead to gangrene, severing the pedicle and permitting the tumor to be expelled. The polypus itself, however, may also become gangrenous, and thus be expelled as a whole or in pieces. In that case there is danger of septicæmia. The possibility of perforation into other organs has been considered under the head of fibroids.

Sterility, due partly to catarrh of the uterine mucous membrane, partly to the mechanical obstruction, is the usual, if not the uniform result of a polypus. If the latter has passed into the vagina, the act of coition itself may be rendered very difficult and painful, and be accompanied by hemorrhage.

Diagnosis.

The diagnosis is very difficult as long as the polypus has not escaped from the uterine cavity, or the cervix will not admit the finger (the latter is often temporarily practicable during the menstrual period). Up to this time it is only possible to determine the uniform enlargement of the uterus, and to diagnosticate a submucous fibroid in the manner indicated above. If the symptoms demand more positive knowledge with regard to the method of its attachment, the cervix must be dilated with a sponge-tent, and the insertion of the tumor explored with the finger, or where it will not reach, with the sound. A good way of testing its mobility is to seize it with the forceps and turn it upon its axis, according to the advice of Scanzoni.

If a polypus has passed into the cervix or vagina, there are usually no serious difficulties in the way of its recognition. The evidences distinguishing it from inversion have already been cited. They are to be distinguished from mucous polypi, which are smaller and arise from the cervix, by the great difference in their consistency, although, exceptionally, a fibrous polypus may be very soft.

The same diagnostic sign holds good as applied to an ovum lodged in the cervix, as well as to a fibrinous polypus.

Ulcerated spots at the extremity of the polypus, which admit the tip of the finger, like a fissured os, may, on a superficial examination, lead one to suspect prolapsus or descensus uteri,¹ or the presence of a malignant growth.

There may be great difficulty in determining the method or point of attachment in polypi of such size that the finger cannot be passed around the tumor. It may then be necessary to draw the tumor out to the vulva, or, where that cannot be done, to remove it piecemeal. Another error, with regard to the pedicle, may arise from mistaking a strangulated portion thereof, embraced within the os, for the point of insertion.

The differential diagnosis between these growths and polypoid sarcomata can only be made by means of the microscope after their extirpation, inasmuch as they may both have precisely the same history.

Prognosis.

If polypi are not removed by an operation, the prognosis is unfavorable, as the natural method of cure (expulsion by gangrene) is rare and not without danger, and as the hemorrhages, which are very prostrating, do not cease spontaneously.

Their removal by an operation improves the prognosis materially, as it is usually safe, not very difficult, and followed by a radical cure.

Treatment.

The only rational treatment consists in a *radical cure* through removal of the polypus.

The methods which accomplish this end in mucous polypi, such as cauterization, twisting, crushing, and tearing out of the growth, are not adequate in fibrous polypi. The most that can be expected from these methods is that occasionally a small

¹ See the cases of *Scanzoni*, l. c., p. 97, and *Martin*, Boston Med. and Surg. Journ., June 11, 1868.

fibrous polypus, which is not continuously attached to the uterus, may be twisted off.¹

As a rule, other means have to be employed. The plan formerly most in vogue was

Ligation.—This is often very difficult to accomplish. If the polypus has escaped from the vaginal entrance, or can be drawn out so far that the pedicle is to be seen, the application of a ligature is easy. If, however, the pedicle lies high in the vagina or in the uterus, the application of the ligature can only be accomplished by means of instruments (an immense number of which have been proposed for this purpose),² and is very difficult. After the ligature has been drawn tight, it is not uncommon for severe pains to set in, or even for metritis and parametritis to arise; and a long time elapses before the gangrenous polypus falls off. During this time, aside from the annoyance caused by the decomposing polypus in the vagina, there is danger of septic infection.

Owing to these objections, this procedure is now generally abandoned.

The method most frequently employed at present is

Excision.—This may be best accomplished by means of a pair of strong scissors (Siebold's) curved flatwise (see Fig. 95). It is well to draw the polypus as far down as possible. The operation is, of course, easiest if the polypus lies outside of the vulva, so that the pedicle can be severed, by the knife or scissors, without any further ceremony. In other cases it is to be left *in situ* only if it is so small that the pedicle can easily be reached by the fingers, and by the scissors passed up along the fingers. If it is larger, so that there is difficulty in passing the fingers or scissors between the polypus and the vaginal walls, it must be drawn down to the outlet of the vagina. This may be done either by passing a ligature through it or by seizing its extremity with Muzeux' forceps, or, if the polypus is very large, by the use of

¹ *Brown* (Boston Gyn. J., Vol. II., p. 2) reports a case in which evulsion of a polypus was followed by fatal tetanus. It is true that dilatation of the cervix by spongetents had been accomplished. *Porter Smith* (Med. Times, 1861) also saw a case of tetanus after the use of the ligature.

² *Kilian*, Die rein chir. Oper. d. Geb., II. Aufl. Bonn, 1856, pp. 230 et seq.

obstetrical forceps. This latter proceeding, if the tumor is very extensive, may present the same difficulties as extraction of a child's head, so that prolonged traction, and even incisions into the external genitals, may be required.

In the extraction of polypi, the uterus naturally descends low in the vagina. But this artificial prolapse does no mischief, if one is only careful not to leave a partial inversion as the result of dragging on the pedicle, so that, in fact, the upper part of the pedicle consists of an inverted portion of uterine wall. This inversion is not very easily accomplished, because the floor of the uterus is hypertrophied.

When the pedicle is rendered accessible by these means, it should be cut off at its thinnest point. There is no need of making any special effort to cut it off as high up as possible, as the remaining portion of the pedicle shrivels, and never gives rise to any evil symptoms.

The hemorrhage, as a rule, is very insignificant, so that no subsequent treatment is required. If it should prove to be more serious, a tampon may be applied to the vagina.

If the uterus cannot be drawn far enough down to make the pedicle of the tumor accessible, without the employment of too great force, and if it is impossible to reach the pedicle by passing around the tumor, the operation becomes a difficult one. It then becomes necessary either to remove the tumor piecemeal, or to undertake what is known as "operative elongation." The removal of the growth by pieces may also become necessary, if it is so large that it cannot pass through the pelvic outlet. The tumors most easily removed, then, are those which are quite soft, as large pieces can be turned out of them by the hand, and thus the pedicle gradually reached.

The operative elongation of polypi may be accomplished by making deep, lateral incisions, according to Simon;¹ or, accord-



Fig. 95.
Siebold's scissors.

¹ Monatsschr. f. Geb., B. 20, p. 467.

ing to Hegar,¹ by running spiral incisions over the tumor, carrying them pretty regularly as high up as the middle thereof, or even higher. The polypus is thereby lengthened, and its thickness so diminished that it is possible to press past and reach the pedicle.

If the tumor is too large for the true pelvis, the operation becomes one of great difficulty. It must then generally be removed in pieces, which implies great danger of the patient sinking from exhaustion, from the effect of wounds made in effecting this purpose, as well as under the suppuration and expulsion of retained remnants.² Byrne³ employs the galvano-caustic loop, cutting such large tumors through smoothly, and then extracting the pieces.

If the polypus is still in the womb, and cannot be reached without dilatation, its removal, even if it is small, is difficult and dangerous. It should, therefore, only be undertaken if very urgent symptoms demand it; otherwise, it is better to wait until natural and artificial means have conspired to drive it into the vagina. In the operation the cervix must, first of all, be sufficiently dilated (by sponge-tents as well as through the drawing down of the polypus), the uterus must be forcibly pushed down by pressure on the abdominal walls, half the hand must be passed into the vagina, and then, the scissors being introduced and guided by two fingers, an attempt must be made to cut the pedicle, or to pass a wire over the polypus by a method about to be described.

Various polyptomes have also been invented for this purpose, by Lever and Simpson,⁴ for example, most of which consist of hooks, sharp on their inner surface, which are to be passed around the pedicle, and thus cut it off. Aveling⁵ has introduced an instrument similar to Scanzoni's, by means of which the pedicle is embraced by a blunt hook, and a knife is made to slide forward and cut it. These instruments are not likely to

¹ *Monatsschr. f. Geb.*, B. 21, p. 220.

² *Wulter*, *Dorpater med. Zeitschr.*, 1873, B. 4, H. 1, p. 1.

³ *Amer. Jour. of Obst.*, Vol. VI., pp. 120 et seq.

⁴ *Sel. Obst. Works.* Edinb., 1871, p. 725.

⁵ *London Obst. Trans.*, IV.

prove of much practical value, as, in all cases in which they can be used, the same end could be attained by Siebold's scissors or the wire *écraseur*.

In view of the great loss of blood which patients have almost always undergone, it often becomes of the greatest importance to spare them even the small amount of hemorrhage which accompanies an operation with the knife or scissors. It is then advisable, especially in cases that have to be operated on *in situ*, and in which, therefore, the pedicle is more inaccessible and hemorrhage less under control, to make use of the *écraseur* or of the galvano-cautery.

The use of the chain-*écraseur* is by all means and altogether to be prohibited, for even if one has a curved instrument and Sims's chain-guard,¹ it is difficult of application and is liable to amputate a considerable area of uterine mucous membrane. It is far easier to apply the thin wire belonging to the *écraseur* represented in Fig. 48.² If this is well applied, it cuts the pedicle through smoothly, and hemorrhage is pretty certainly avoided.

The loop employed in the application of the galvano-cautery is even more easily handled, as it is more pliable. The pedicle is slowly cut through, under the use of a moderate red heat.

Symptomatic treatment is only called for if the polypus is inaccessible, that is, if it is hidden in the womb; the rule then being to postpone any operation until the tumor shall have descended through the cervix. It is only under very urgent necessity that we should proceed to the artificial dilatation of the neck by sponge-tents and amputation of the tumor. Under these circumstances it is always a very difficult operation, and not without danger.

The symptom which calls most urgently for relief is hemorrhage. This may be best controlled by the use of ergot and of the cold douche, the relief given by a tampon being altogether transitory. The injection of solutions of chloride of iron should only be resorted to if everything else fails, as it may be followed by adhesions between the polypus and the uterine walls, which

¹ Loc. cit., p. 79.

² *Braxton Hicks*, Guy's Hosp. Rep. XIII., p. 128.

will greatly increase the difficulty of any subsequent operative procedure.

If the polypus is accessible, it should be removed at once ; the postponement of an operation being but very exceptionally justified in case of extreme debility or of some inflammatory complication. Then hemorrhage may have to be controlled, for a time, by the use of the tampon, and the strength of the individual maintained by the usual means.

Uterine Cysts.

Aside from the pseudo-cysts, which may be developed in large fibroids by the separation of muscular fibres through an accumulation of serum, the development of cysts in the parenchyma of the uterus is an occurrence of extreme rarity. At all events, very few cases of this kind are to be found in the literature of the subject. What have been most frequently described as cysts, lying beneath the peritoneal covering of the uterus, are those accumulations of yellow serum which are not rarely developed within an intra-peritoneal pseudo-membrane in the true pelvis.

A case of considerable cyst-formation within the largely hypertrophied parenchyma of the uterus (not in a round fibroid) is described by Boinet.¹ Demarquay² reports a case in which the apoplectic origin of the cyst is hardly to be mistaken. Another case was operated on by Péan.³

Dermoid cysts also occur in the uterus. Among the recent observations of this subject are those of Wagener⁴ and Kiwisch.⁵

PAPILLARY TUMORS OF THE UTERUS.

John Clarke, Transact. of a Soc. for the Improv., etc., 1809, Vol. III., p. 321.—

Charles Mansfield Clarke, Observ. on Diseases of Females which are attended

¹ Gaz. hebdom., 1873, No. 13, p. 199.

² L'Union méd., 1868.

³ L'hystérotomie. Paris, 1873, p. 96.

⁴ Archiv f. physiol. Heilk., 1857, p. 247.

⁵ Klin. Vortr., etc., IV. Aufl., B. I., p. 456, cysts the size of a child's head, containing hair and teeth, on the inner surface of the womb, without any further particulars.

by Discharges. London, 1821, Part II., p. 57.—*Thomas Safford Lee*, loc. cit., p. 81.—*Renaud*, London Med. Gazette, August, 1848.—*Watson*, Monthly J. of Med. Sc., October, 1849, p. 1183.—*Virchow*, Verh. d. phys. med. Ges. in Würzburg, B. I., 1850, p. 106.—*C. Mayer*, Verh. d. Berl. Ges., f. Geb., 1851, H. 4, p. 111.—*Mikschik*, Zeitschr. d. Ges. d. Wiener Aerzte, 1856, 12 Jahrg., p. 40.—*Braxton Hicks*, Guy's Hosp. Rep., 1861, VII., p. 241.

Until quite recently, benign papillomata and canceroid forms of cancer have been confounded with one another, and, indeed, the two show great similarity in their method of origin and in their appearance on examination; in fact, there can be no doubt that canceroid tumors sometimes spring from what were, originally, benign papillary growths. It is, therefore, easy to understand why, since John Clarke first called attention to the “cauliflower excrescence” of the vaginal portion of the cervix, there should have been conflicting views held with regard to the significance of the same, especially in a prognostic point of view. A rigid distinction must nevertheless be drawn between these two varieties. The simple branching and proliferation of the villi, causing them to project into the vagina, constitutes a perfectly benign form of tumor, with no tendency to recur; while the cancerous character of the growth, with all the consequences therein implied, is assumed as soon as the epithelial layers lying between the villi begin to proliferate inwards towards the central structure of the uterus. This much, however, is certain, that the larger tumors, of the cauliflower variety, are far oftener malignant than benign.

Etiology.

Papillomata of the vaginal portion of the cervix are of two kinds, differing both in their origin and their course. The one variety is caused by the specific irritation of gonorrhœal matter, just as pointed condylomata may be produced by the same cause in other places. The other variety is the simple papilloma, which is most readily produced by some continuous irritant, operating upon an eroded spot, and stimulating the denuded villi to proliferation. It must be admitted, however, that under these circumstances, too, the production of large papillary tumors is uncommon.

Pathological Anatomy.

Benign papillary growths, having none of the characteristics of a cancer, present themselves under the form of a somewhat pedunculated tumor, showing a bright red color in the speculum, and, in their structure, presenting a truly striking resemblance to the fine branching of a cauliflower.

The two forms of papillary growth, the pointed condyloma and the truly benign papilloma, are exactly alike as regards the finer tissue-changes which they present. These consist in a growth of the papillæ or villi, which become hypertrophied either in the form of a long, club-shaped swelling, or of one with numerous branching extremities. The tissue of the papilla presents its normal components—delicate connective tissue, containing a loop of blood-vessels, often very branching. The papillæ are covered with epithelium, which is generally also greatly hypertrophied, covering the papilla in thick layers. The substance of the uterus is perfectly normal; the epithelium lying between the papillæ, therefore, does not penetrate into the substance of the organ, there to form cancerous nodules.

Pointed condyloma of the vaginal cervix does not arise from one circumscribed point, but originates, in a diffuse manner, from various portions of the mucous membrane. It is uniformly found in connection with the same class of condylomata of the vagina or external genitals. At first the papillary growths are fine and tender, and the individual villi become thinner towards their free extremity. Later, however, the ends become more club-shaped, and are covered with an abundant whitish epithelium. The form of the growth is sometimes like a raspberry, sometimes like a cauliflower, and again like the comb of a cock. At times the epithelial deposit is so abundant that it fills the interspaces between the club-shaped extremities of the papillæ, so that the surface of the growth assumes a uniform character. After persisting for some time, the pointed condylomata may assume a considerable degree of hardness.

Benign papillomata, which are very rare in connection with the vaginal cervix, are always solitary, arising from a greater

or smaller portion of the mucous membrane. From this point they grow into the vagina, as a polypoid tumor, and may exactly resemble a tightly compressed, strongly proliferating, pointed condyloma.

Cysts may also be developed in a papilloma, the strong pressure of the vaginal walls causing adhesions between the free, club-shaped extremities of the villi, and leaving free spaces between the latter, which are converted into cysts by a secretion of mucus.¹

Symptoms.

The most constant symptom is blennorrhœa, which is pretty abundant in pointed condylomata, and often quite insignificant in a papilloma provided with a thick epithelial covering. If the loops, however, are thick, club-shaped, vascular, and but scantily covered with epithelium, quite a profuse watery flow may take place, which also sometimes alternates with hemorrhages.

Undoubtedly papillomata which were originally benign may undergo carcinomatous degeneration, although this degeneration does not seem to be very frequent, at least in the larger tumors. Pointed condylomata may undergo a retrograde metamorphosis, whereby their vessels disappear and they shrivel. A natural cure may take place in non-specific condylomata by the suppurative destruction of the pedicle and the subsequent expulsion of the tumor.

Diagnosis.

The two varieties of non-malignant papillomata may be pretty certainly distinguished by their etiology and the method of their appearance. Simple papilloma occurs as a single tumor, while the pointed condyloma is only one of several evidences of irritation of the papillary body, which not only gives rise to numerous growths in the vaginal part of the cervix, but causes the same to appear in the vagina and on the vulva.

The most important point in differential diagnosis lies in distinguishing these growths from the canceroid form of cancer. In the latter, the mucous membrane is early adherent to the

¹ *Rindfleisch*, *Monatsschr. f. Geburtsh.*, B. 24, p. 438.

subjacent tissue, as the epithelial depressions penetrate into the parenchyma of the vaginal part of the cervix. In benign papillomata, which only lie in or project from the mucous membrane, this is freely movable. The canceroid, therefore, seems to arise from the parenchyma of the cervix, while the benign papilloma merely constitutes an appendage to the mucous membrane.

In watching the progress of the disease, it will be found that the purely papillary growths enlarge but slowly, while canceroids spread rapidly and ulcerate early.

Prognosis.

The system may be greatly weakened by the serous and bloody discharges spoken of above, the former of which are often exceedingly profuse. When the diagnosis is unequivocal, too, the possibility of transformation into carcinoma must ever be borne in mind, though it supervenes but rarely in large tumors, especially if they are specific in character.

Treatment.

The removal of the tumors, which is always indicated, may be undertaken with the curved scissors, or, in large tumors, may be effected, to very good advantage, by means of the wire *écraseur*, or the galvano-caustic loop. The operation presents no difficulties, but care must be taken to remove the tumor close to its point of insertion. The stump may be cauterized with the hot iron, to arrest hemorrhage, as well as to destroy any cancerous collections which may have been formed within the pedicle.

CANCER OF THE CERVIX UTERI.

Besides the literature given in the article on papillary tumors, refer to *Wenzel*, Ueber die Krankh. des Uterus. Mainz, 1816.—*Beyerlé*, Ueber den Krebs der Gebärmutter, 1818.—*W. J. Schmidt*, Ges. obstet. Schriften. Wien, 1820, p. 110.—*E. von Siebold*, Ueber den Gebärmutterkrebs, etc. Berlin, 1824.—*Teallier*, Traité du cancer de la matrice, etc. Bruxelles, 1836 (Deutsch, Quedlinb. u. Leipzig, 1836).—*Duparcque*, Traité des mal. org. simples et cancér. de l'utérus. Paris, 2d ed., 1839.—*Montgomery*, Dublin Journal, Jan., 1842.—*Walshe*,

Nature and Treatment of Cancer. London, 1846.—*Th. S. Lee*, On Tumors of the Uterus and its Appendages. London, 1847, p. 111.—*Robert*, Des affections gran., ulc. et carcinom. du col. de l'utérus. Paris, 1848.—*Lebert*, Traité prat. des mal. cancé. Paris, 1851.—*Chiari*, Braun u. Spaeth, Klin. d. Geb. u. Gyn. Erlangen, 1852, p. 673.—*E. Wagner*, Der Gebärmutterkrebs. Leipzig, 1858.—*L. Mayer*, M. f. Geb., B. 17, p. 241.—*Tanner*, On Cancer of the Female Gen. Organs. London, 1863.—*Süxinger (Seyfert)* Prager Viertelj., 1867, 1, p. 103.—*Lusk*, New York Med. J., Sept., 1869.—*Blau*, Pathol. Anat. über den Gebärmutterkrebs. Diss. Inaug. Berlin, 1870.—*Fordyce Barker*, Trans. N. Y. Acad. of Med., Feb. 18, 1870 (see Amer. J. of Obst., III., p. 519).—*Gusserow*, Volkmann's Samml. klin. Vortr., 1871, No. 18.

Etiology.

The marked ratio in which the female sex is attacked by cancer is entirely due to the frequency of cancer of the uterus. According to Simpson, 61,715 women and 25,633 men died in England of cancer between the years 1847 and 1861. A third of all the women dying of cancer suffer from cancer of the uterus, while carcinoma of the mamma stands second on the list.¹

The influences, however, which determine the dreadful frequency with which carcinoma is developed in the cervix uteri are practically unknown.

North American authorities agree that negro women, in whom uterine fibroids are singularly common, are very seldom affected by carcinoma uteri, or, indeed, by any form of cancer. Thus Whitall, of New York, saw only two cases of malignant disease of the uterus among 2,000 colored women treated by him. According to the statistical statements of Chisolm, out of 4,052 whites, men and women included, 35, or 0.86 per cent., died of cancer; while of 10,828 blacks, men and women included, only 40, or 0.37 per cent.—less than half as many—died of the same disease. From these reports it also appears that in North America cancer is much more rare even among the whites than in Europe.

As regards age, we find the frequency as follows, if, aside from our own observations, we group the figures of Lebert, Kiwisch, Chiari, Seyfert, Scanzoni, Lever, Lee, and Tanner (the

¹ According to *Hough*, *Tanchon*, *Simpson*, *Eppinger*, *Willigk*, and *Wrany*, of 19,666 women dying of cancer, almost exactly one-third had cancer of the uterus.

figures of Boivin and Dugès must be set aside as untrustworthy).

Of 745 women affected with cancer of the uterus, there were :

Under 20 yrs.	20-30.	30-40.	40-50.	50-60.	60-70.	Over 70.
0	43 (5.77%)	167 (22.4%)	312 (41.9%)	155 (20.8%)	62 (8.32%)	6 (0.8%)

We get the following figures in 492 cases, as the results of post-mortems, from Hough, Blau, and Dittrich :

Under 20 yrs.	20-30.	30-40.	40-50.	50-60.	60-70.	Over 70.
0	22 (4.47%)	107 (21.75%)	133 (27%)	153 (31.1%)	53 (10.77%)	24 (4.87%)

Here, then, the average is removed to a somewhat more advanced age, and this is explained in part by the fact that carcinoma uteri comes under the view of the pathologist later than under that of the clinical observer.

According to these figures carcinoma uteri does not occur at all before puberty, or, in fact, before the twentieth year; its frequency then increases up to the fifth decennium, to fall again somewhat after the menopause. Still, according to these figures, we find even after the menopause a very considerable number affected with the disease, and the number is actually greater, since the absolute number of women of this age is materially less. This appears more markedly from the statistics of Glat-ter,¹ in which the number of women dying of cancer is compared with the whole number of those of the age in question. Accord-
ing to these, there died in Vienna :

Of cancer of the uterus, of women from 21-25 years old, 0.1%						
"	"	"	"	26-30	"	1.05%
"	"	"	"	31-35	"	1.45%
"	"	"	"	36-40	"	3.64%
"	"	"	"	41-45	"	4.73%
"	"	"	"	46-50	"	6.62%
"	"	"	"	51-55	"	5.5%
"	"	"	"	56-60	"	3.96%
"	"	"	"	61-65	"	2.04%
"	"	"	"	66-70	"	2.03%
"	"	"	"	71-75	"	0.91%
"	"	"	"	76-80	"	0.66%
"	"	"	"	over 80	"	0.36%

¹ Vierteljahrschr. f. öff. Gesundheitspflege, 1870, II., p. 161.

The climacteric period, then, furnishes the most considerable number of deaths from carcinoma uteri. After this the proportion only very gradually diminishes. Taken altogether, therefore, 2.5 per cent. of all women over twenty died of this disease.

It has always been maintained that sexual indulgence, especially when excessive, favors the occurrence of carcinoma, and this neoplasm is, in fact, met with more frequently in married women. We find that of five hundred and thirty-one patients observed by Chiari, Seyfert, Scanzoni, West, Tanner, Gusserow, and myself, four hundred and forty-nine had borne children and only eighty-two had not. A considerable number of instances of excessive child-bearing, too, is found among patients with carcinoma. Among my own there was one woman who had had thirteen and, another fifteen births. The influence of regular sexual indulgence is most clearly traced in the comparative statistics of Glatter. According to these there were :

	Single.	Married.	Widows.
Out of 1,000 Vienna women over 20 years old.....	459	408	133
“ “ “ “ with cancer of the uterus.	229	503	268

It is very evident from this how very much less frequent death from cancer of the uterus is among single women.

It is still very doubtful if we should allow a knowledge of these facts to influence us in indicating traumatic irritation simply as the cause, if we consider that the state of rest, in which the vaginal portion constantly remains, is even in the most frequent practice of coitus and in labor relatively very seldom interfered with. Prostitutes have no special tendency to cancer of the uterus. The ungovernable sexual passion exhibited by many women with carcinoma is only the symptom of a uterine disease. It is also very striking that the uterine orifice is, like most other orifices,—as the lips, the pylorus, the cæcum, and the rectum,—so often affected by carcinoma.

Least of all does the influence of hereditary descent seem to be established by the statistics hitherto attainable, although we must allow that it has at least some slight foundation. Among three hundred and twenty-six cases collected by Gusserow¹ (Gus-

serow, Tanner, Lever, Lebert, Scanzoni, and West), a hereditary character could be proved but thirty-four times. According to Sibley, it could be proved eight times in one hundred and thirty-five; according to Barker, thirty-six times in four hundred and eighty-seven cases; taken altogether, seventy-eight times in nine hundred and forty-eight cases.

Scanzoni lays great stress upon previous depressing states of the mind; at all events, their influence is very important, etiological, in individual cases.

Pathological Anatomy.

In the nomenclature of the malignant tumors of the cervix, such confusion and uncertainty prevails,—inasmuch as they comprise the malignant cauliflower excrescence of Clarke, the cancrroid, the medullary cancer, and so on up to scirrhus,—that we must first of all explain ourselves as to the various forms of cancer.

In the first place, we declare that we neither separate the malignant papillary tumors from cancrroids, nor the latter from carcinomata. We follow the views of Waldeyer, who refers the origin of all the forms of cancer to the true epithelia, considering them all as epithelial tumors, which develop, without exception, from actually existing epithelium; and who, in the very rare cases where primary carcinomata have developed in places where there is no native epithelial soil, regards them as arising from abnormally distributed remnants of the epithelial blastodermic membrane. They are thus sharply defined from the sarcomata, which are pure connective-tissue tumors.

The carcinomata, then, are developed by normal pavement or glandular epithelium penetrating with its ramifications into the depths of the tissues in all directions like plugs, destroying the other tissues by pressure, and forcing apart the bundles of connective-tissue fibres, so as to form for itself a framework of connective tissue, and an alveolar structure for the whole tumor.

¹ Loc. cit., p. 121.

According, now, to the preponderance of either this connective-tissue framework—which is also partly a new formation from the irritated connective tissue—or the nests of cancerous epithelium, we distinguish the harder forms—scirrhus, and the softer—medullary cancer.



FIG. 96.

Cancroid of the anterior lip.



FIG. 97.

The same patient, fifteen months after the operation.

A more strict separation of these forms is, from a clinical point of view, impracticable; for multiform and differing in appearance as are the forms which here present themselves, they still have precisely the same significance, very commonly in the same individual pass one into another at some place or time, and consequently must be considered as belonging together throughout.

In the description of the separate forms we begin with *malignant papilloma*.

This, at the beginning, bears great external resemblance to the benign papilloma, which has already been described; only the epithelial plugs sink more deeply into the tissue between the papillæ so that epithelial cancer-nests are found beneath the

mucous membrane. If we make a cut through the tumor, parallel with its attached surface, the sections thus obtained are not uniform, but we observe in them roundish spaces varying from a very small size to above that of a pea, and containing either a yellowish greasy mass, which can be squeezed out like a comedo, and consists of the compressed epithelial cells, or a juice of greater or less consistency, composed of cancer cells, in part undergoing fatty degeneration, and in part suspended in serum. These tumors form the majority of *Clarke's cauliflower excrescences*.



FIG. 98.

Large cancriod of the portio vaginalis.



FIG. 99.

Great carcinomatous proliferation of the cervix and surrounding connective tissue.

In other cases the papillary proliferation is much less marked. The individual papillæ are only swollen into a club shape at their ends, not so as to form papillary tumors with abundant ramifications, but so that the surface of the mucous membrane merely acquires a somewhat granular appearance. In these cases the mucous membrane is seated firmly upon an infiltrated and hardened base, because, to be sure, the epithelium has gone on developing like plugs in the submucous tissue, and,

according to Waldeyer's striking expression, has nailed on the mucous membrane as if with tacks. As the cancer-nests become larger they break down, first in the middle, into a yellowish, greasy pulp, and the framework of connective tissue that lies between them becomes gradually gangrenous from the increasing pressure. An abscess thus forms directly under the mucous membrane, and soon breaks through it and discharges externally, leaving behind the characteristic cancerous ulcer. At the same time the process of epithelial proliferation encroaches also upon the normal tissues in the neighborhood, so that soon the vault of the vagina is also infiltrated, *i.e.*, hardened and fixed in position.

The cancer exhibits the cancroïd form if the mucous membrane is irritated by the newly formed epithelial masses or involved in a papillary proliferation, so as to encroach to a marked extent upon the calibre of the vagina, and thus form a tumor springing from one lip, or from the whole vaginal portion, and which frequently has a distinct pedicle. But in case the epithelial plugs force their way at once deep into the normal tissues, so that it amounts less to a tumor formed upon the vaginal portion than to an actual cancerous transformation of the cervix and surrounding connective tissue, we then have the pure carcinomatous forms. These again may, it is true, show great differences. In the first place, the framework of connective tissue commonly preponderates over the epithelial plugs which penetrate singly into the depths of the tissue. We have then to do with the harder or more scirrhus forms. As a rule, however, the epithelial proliferation soon increases to such an extent that the framework of connective tissue is very much thinned. When, however, the mucous membrane is broken through by the defunct cancer cells, thus forming the cancerous ulcer, then either a great proliferation of the cancer cells begins in the framework of newly formed, delicate, connective tissue, or the meshes of connective tissue early waste away, their contents escape, and lacunæ of considerable size are formed. Here we have the various forms of medullary cancer.

It is unusual, when the whole vault of the vagina, up to the sides of the pelvis, has become infiltrated, for the epithelial plugs

still to lie so far apart from one another that the framework of connective tissue influences the consistency of the tumor, in other words, that even at a late stage of the growth, it should maintain the character of a scirrhus.

As a result of these conditions the external forms of carcinoma of the cervix may be very different. Sometimes we find great papillary tumors (see Fig. 98), in other cases large neoplastic growths are seated upon the smooth mucous membrane, and they have led to decided hypertrophy of the vaginal portion, or have already so involved the vault of the vagina in every direction that it is no longer possible to distinguish the vaginal portion by the touch (see Fig. 99). The external appearance of the carcinoma will therefore differ very much, according to whether the neoplasm has developed considerably before breaking down, or whether the newly formed tissue has wasted away immediately, so that in the vault of the vagina we encounter nothing but a funnel-shaped crater. When the recent proliferations on the margins of the ulcer disappear immediately, the character of the neoplasm may be so little marked that it seems almost possible to mistake the carcinoma for some merely extending or corroding ulcer, like the phagedenic ulcer already described (see Fig. 100).

It ought to be prominently mentioned as highly characteristic of the wide propagation of cancer, that the new formation does not at all respect the limits of any definite tissue or organ. Consequently the disease remains confined to the parenchyma of the cervix for but a short time. Very often it encroaches upon the neighboring connective tissue, so that the boundaries of the cervix are effaced by the uniform hardness, and the swelling of the cervix appears so marked only because the connective tissue at its sides is infiltrated in the same way. This infiltration permeates the connective tissue up to the sides of the pelvis, and even at times the lymphatics, so that they are found choked with cancer cells.

In an upward direction the proliferation advances uninterruptedly up to the vicinity of the os internum. Here it is not seldom arrested, so that occasionally the whole cervix is ulcerated away, while the neoplasm has attacked the body of the uterus

to only a very inconsiderable extent. In other cases, it is true, the body is also completely involved in the degeneration, so that it first becomes greatly hypertrophied and then gradually destroyed by ulceration. In fact, the process may even extend to the Fallopian tubes. Blau found that, in ninety-three cases, the neoplasm had passed above the os internum to the body of the uterus thirty-one times; Wagner, in eighty-three cases, thirty-two times. It is possible, however, for metastatic nodules to form in the body without continuous connection with the cancer of the neck.



FIG. 100.

Carcinomatous ulceration, which has destroyed the greater part of the uterus.



FIG. 101.

Carcinoma of the cervix, with secondary extension to the vagina and rupture into the bladder.

The process very commonly, and, as a rule, very early spreads to the mucous membrane of the vagina, though generally only to its upper third. The anterior vaginal wall chiefly shows the tendency of the degeneration to go downwards, and here the mass containing the urethra may sometimes be found infiltrated. Considerable tumors do not readily form on the vaginal mucous membrane, but it generally happens, especially if the mucous

membrane is much thickened, that ulceration takes place early. If the neoplasm has extended to the wall of the vagina, generally all the boundaries between the vagina and uterus have disappeared, and one is inclined to estimate the vagina as too short, and to take all that is cancerous as belonging to the cervix, particularly if the infiltration of the vaginal walls is so thick that its calibre has almost disappeared (see Fig. 101).

Carcinoma of the anterior vaginal wall and of the anterior lip, when it goes deeper, is very apt to involve the bladder. Here it forms at first projections of the mucous membrane until this latter ulcerates and breaks down, and, if the carcinomatous tissue of the septum has been melted down, a great vesico-vaginal fistula is formed. According to Blau, this occurred twenty-eight times in ninety-three cases; according to Eppinger, fourteen times in seventy-nine cases. The urethra, too, may be destroyed, so that there may be a urethro-vaginal fistula, either by itself or associated with the other. In other cases the ureters are attacked, and hydronephrosis results, either from this cause, or, more frequently, from the traction or pressure of neighboring cancerous nodules or inflammatory exudations. Blau witnessed this result fifty-seven times in ninety-three cases; Seyfert even maintains that death is due to uræmia in most cases of carcinoma uteri.

Still more rarely does perforation of the rectum occur in the same way from the posterior vaginal wall; according to Blau, thirteen times in ninety-three cases; according to Eppinger, three times in seventy-nine cases. Thus from its breaking through into both organs a vast cloaca may be formed out of the three openings.

As a rule, the carcinoma does not break through into the abdominal cavity, because inflammatory thickenings and adhesions form at those points of the peritoneum towards which the proliferation extends, and do not permit the actual perforation to take place. Consequently in carcinomata, which have advanced far in an upward direction, we find very many cicatricial adhesions bridging over the anterior and posterior excavations of the peritoneum, and gluing the appendages of the uterus together, and to the intestine and mesentery. In these pseudo-

membranes are often found areas of pasty, circumscribed œdema, which appear like large yellow cysts in the membranes.

In other cases, however, the carcinomatous nodules also develop directly in the abdominal cavity, or there are open communications between the ichorous cavity of the vagina and the abdominal cavity.

The degeneration may also extend laterally to the connective tissue, the muscles, the periosteum, and even the bones of the pelvis, so that the whole of the true pelvis may appear filled with carcinoma. It also attacks other organs, such as the nerves, the veins, and especially the lymphatic glands.

Going upward, the carcinoma may not merely attack the body of the uterus, the tubes and ovaries, but even the adherent omentum and the intestine, so that portions of the latter, and not the rectum only, may open into the general cloaca. The body of the uterus and the tubes are, as a rule, attacked from continuous extension only, but the ovaries by metastasis.

Thus, in the most advanced cases, there may come to be one great ichorous cavity, into which the bladder and rectum open, and in which every trace of the uterus has disappeared. Those parts of the walls of this cavity which do not show evidences of carcinomatous infiltration are frequently covered with diphtheritic deposits.

Secondary carcinomata in other organs are not rare ; they occur most frequently in the inguinal, lumbar, and retro-peritoneal glands, also in the ovaries, liver, and lungs, and exceptionally in almost all the other organs.

Among 292 cases collected by Arnott, Wrany, Blau, Kiwisch, Lebert, and Wagner, carcinomata of the ovaries are mentioned fifty-one times, and of the liver twenty-four times. As opposed to various reports, secondary carcinoma of the mamma is very rare ; among the 292 cases it occurred but three times.

Symptoms.

The malignancy of carcinoma of the cervix is enhanced by the fact that the beginnings of the tumor usually furnish no symptoms whatever, so that the trouble is almost always discov-

ered too late; only in malignant papilloma does blennorrhœa occur early, and sometimes there is also bleeding. In the other forms of cancer, however, the discharge at the beginning is very slight, so that the disease, in the absence of all other alarming symptoms, usually first comes to the knowledge of the physician when the carcinoma has broken down, and the cancerous ulcer has actually formed.

Then appear an abundant blennorrhœa and attacks of metrorrhagia. The latter are first noticed only as an increase of the normal menstruation, but subsequently at other times also. It is not unusual for the first sign noticed to be a discharge of blood after coitus. The hemorrhages may be entirely wanting, especially in the scirrhus forms; but they are, as a rule, present, and may be of such an extent as to result in the most extreme degree of anæmia. Still, death scarcely ever occurs as the immediate result of hemorrhage.

The first considerable blennorrhœa generally shows itself after the first hemorrhages, although slight mucous discharges, not sufficient to attract the attention of the woman, have preceded them. The blennorrhœa may, as in the papillomata, be almost purely serous, and of a stale but not offensive smell; but so soon as a cancerous ulcer is formed, the secretion becomes more suspicious; its color becomes darker from the admixture of fragments of gangrenous tissue—gray, yellowish, greenish, brownish, or even black,—and there is an offensive and sometimes a truly horrible smell.

In the beginning the pain is apt to be very slight or wholly absent, especially if we remember that there are pains in the back and a feeling of pressure in the belly in almost all diseases of the uterus. More severe pain sets in when the infiltration has extended to the connective tissue of the pelvis, and, in fact, it usually is worse the larger and harder the growths become; so that we find the severest pains in those carcinomata in which the ulceration is slight and occurs late, and when infiltrations of a board-like hardness fill the whole pelvis. To be sure, this is not invariable, so that we occasionally meet with the most intense pains in cases where the cancer consists almost wholly of ulcerated surfaces, and the reverse is also true.

To these pains, which are dependent on the growth of the carcinoma itself, and which are often of a piercing, lancinating character, are added those referable to peritonitis from the formation of inflammatory adhesions, so soon as the neoplasm encroaches upon the peritoneum. Uterine colic may also be very troublesome. Sometimes exceedingly violent pains of this kind, occurring at intervals, may be occasioned by the new growth constricting the cervical canal, so that the secretions of the uterine cavity are retained. A slight degree of hæmatometra or hydrometra may even be caused by occlusion of the cervix.

The peculiar hardness of the abdominal integuments, so characteristic of the later stage of carcinoma, is caused in great part by the pain. The muscles at that period are constantly on the stretch, and the intestine somewhat distended, so that the integuments present a peculiar sensation of rigid hardness.

The appearances which remain to be mentioned are developed by the advance of the disease to the neighboring organs. Carcinoma quite regularly extends to the anterior wall of the vagina, and thus approaches the bladder. As a consequence of the irritation of the mucous membrane of the bladder, pain and burning on urination are apt to supervene. Retention of urine in the bladder is rare, but hydronephrosis, with consecutive affections of the kidneys, is a very frequent occurrence. The ureters are very apt to be narrowed, partly by carcinomatous growths and partly as a result of flexures and constrictions due to the processes going on around the uterus. If the mucous membrane of the bladder is involved in the degeneration, we have catarrh or diphtheria of the bladder, and, after the ulceration of the neoplastic masses, a vesico-vaginal fistula, with its sad consequences.

The carcinoma also not infrequently passes over to the rectum. Even before that, we may have obstinate constipation, as well as catarrh of the large intestine, if considerable tumors narrow its calibre. If perforation takes place, we generally have as a result the formation of a cloaca—as a fistulous opening into the bladder is usually formed before this occurs.

The general condition may be excellent at the beginning of

the disease, especially up to the period of ulceration. Gradually, however, it becomes very bad, in part from the loss of blood and nutrient fluids from the cervix, but in great part, also, from the disturbances in the intestinal canal, which are the constant accompaniments of carcinoma. In some cases obstinate constipation is present, while in others, generally beginning in the later stages, there is profuse diarrhœa, together with very great loss of appetite, and quite commonly vomiting. The latter symptom may depend upon various causes, among which Gusserow especially calls attention to the nauseating discharge and the uræmia caused by the constriction of the ureters. If the pain deprives the patient of rest at night, if the blennorrhœa is very profuse, and if the hemorrhages are abundant, the most marked cachexia will be established, with extreme emaciation and œdema.

The majority of the patients die slowly of marasmus, associated sometimes with uræmia and septic conditions. Very often an intercurrent peritonitis or some disease of the respiratory organs closes the scene.¹

The duration of the disease is very difficult to estimate, because of its latency in the early stages, and at all events it varies greatly. According to Arnott, the averaged uration of carcinoma is 53.8 weeks, of cancrioid 82.7. West and Lebert assign fifteen and sixteen months as the mean duration, while other English, and especially American authors, give much higher numbers. Thus, according to Simpson, carcinoma lasts from two to two and a half years, and according to Barker for three years and eight months; in fact, the latter tells of a patient with carcinoma, in whom he made the diagnosis eleven years before, and who is still able to go to church and to the opera, although the uterus is almost completely destroyed.² For Germany these high

¹ According to Blau, out of ninety-three patients, forty-eight died of marasmus, twenty-seven of peritonitis, eleven of pneumonia, three of pleuritis, three of embolism of the pulmonary artery, and one each of pyelonephritis, fatty degeneration of the heart, gangrene of the lungs, and pyelophlebitis.

² The courtesy of Prof. Barker enables us to state that the patient referred to in the text died in October, 1874, or twelve and a half years after the diagnosis of cancer was made. Bladder and rectum were thrown into one common cloaca with the vagina.
—TRANS.

averages are certainly not appropriate ; we are obliged to assume with Gusserow that carcinoma of the cervix leads to death in from twelve to eighteen months after the first symptoms.

Diagnosis.

Properly speaking, the diagnosis is attended with difficulties only in the first stage, when the carcinoma is not yet broken down ; for, up to that time, it is difficult to distinguish it from homologous hypertrophy of the vaginal portion. The following indications are important for the differential diagnosis between these two conditions :

The consistency of carcinoma is unyielding, although not always very hard, while old connective-tissue growths are occasionally harder, although they always remain somewhat elastic. In the same way the latter affect the tissue of the cervix quite uniformly, while the inelastic hard nodules, lying in approximately normal tissue, are characteristic of carcinoma. We must, of course, guard against mistaking the nodules for swollen follicles, which may feel like them.

The state of the mucous membrane is characteristic of the heterologous growth, for, unless ulcerated, it appears to be firmly attached to the subjacent tissue, and not movable upon it. In Waldeyer's words, "it is fastened by the epithelial plugs to the subjacent tissue as if with little nails."

Further than this, carcinoma is very early found not to be confined to the cervix, like simple hypertrophy of the cervix, but involves the connective tissue of the vault of the vagina, so that the boundaries of the cervix appear completely obliterated ; while, on the other hand, in simple hypertrophy, the cervix, though thick, is still clearly perceptible, and can be felt distinctly defined from the surrounding connective tissue.

Spiegelberg¹ calls attention to the different behavior towards the sponge-tent in these two conditions, for while the sides of the cervix, when simply hyperplastic, will soften and yield under its action, they remain completely unaltered when the seat of carcinomatous degeneration.

¹ Arch. f. Gyn., Bd. III., p. 233.

In the matter of diagnosis it is not unimportant to bear in mind that we very rarely have an opportunity to see carcinoma at so early a stage; consequently in doubtful cases we are almost invariably dealing with benign changes.

Besides, carcinoma of the cervix may exceptionally occur in quite a different way. Thus Hegar¹ observed that the carcinomatous degeneration, in a patient sixty-eight years old, had produced such an hypertrophy of the cervix that the vaginal portion protruded to the extent of three centimetres ($1\frac{1}{2}$ in.) outside of the vulva, while the mucous membrane was wholly intact. The soft consistency of the tumor was suspicious, as well as its rapid development at so late a period of life. At the autopsy of a woman on whom ovariectomy had been performed, I have myself accidentally discovered a medullary carcinoma in the upper part of the cervix. This, being in great part broken down, formed a cavity over which the mucous membrane of the cervix passed smoothly, while the vaginal portion remained completely normal. The ovarian tumor did not contain a trace of a suspicious neoplasm, while a gland in the broad ligament, and the retroperitoneal glands were infiltrated with carcinoma.

The ulcerated carcinoma, which almost exclusively comes under the attention of the physician, presents no further difficulties in diagnosis.

Only occasionally will ulcerating fibroids or polypi be confounded with cancer, a mistake only to be guarded against by very thorough examination.

The question how far the carcinomatous infiltration has already extended is usually very difficult to determine, for frequently the first epithelial forerunners, or sometimes even larger growths, have gone very much further than was believed on examination. In the connective tissue of the pelvis, particularly, will the neoplasm often be found to have gone much deeper than the appearances indicated.

Prognosis.

Unfortunately we shall scarcely ever be mistaken in any single case, in which the diagnosis is well established, if we regard the prognosis as absolutely unfavorable; for a cure by nature unaided hardly ever occurs, and even after operation

¹ Virchow's Archiv, 1872, Bd. 55, p. 245.

recovery is extremely rare, though it may be because patients are operated on too late. In addition to this, the condition of the patients is always a very deplorable one, and is often unexpectedly prolonged and accompanied by intolerable pain, by almost complete loss of sleep, by shocking emaciation, and by a smell which is intolerable not only to those around, but to the patient herself. In other cases, again, a sudden death by peritonitis or pneumonia brings the wished-for end of these intolerable sufferings.

Treatment.

As a matter of course, the radical removal of the carcinoma is to be aimed at in the first place, although unfortunately this is very seldom accomplished. This must be done entirely by operative means, for up to the present time we know of no internal remedies capable of changing this abnormal direction of the cell-growth, for even cundurango is being forgotten again. And besides, at the very beginning of the carcinomatous growth, when we have to do with a decidedly local disease, no result is, *à priori*, to be expected from internal remedies acting through the general system.

The operation is done from the vagina.¹ The most is to be expected from it when we have to deal with a pedunculated tumor springing from the vaginal portion, which has not yet penetrated far into the substance of the lip; for instance, a can-croid or the malignant form of cauliflower excrescence described by Clarke. (See Fig. 96.)

In such cases it is undoubtedly our most urgent duty to remove the tumor as quickly as possible, that is, while the patient is still in good health. The operation is most conveniently done when the uterus can be drawn so far down as to bring the seat of the amputation in front of the vulva. Of course this artificial prolapsus can be made use of only in cases where the carcinoma is implanted on the cervix by a pedicle,

¹ We need not speak of the operative treatment by the removal of the whole uterus by laparotomy, as, of course, this operation can be done only when the vaginal portion at least can be left behind, while in carcinoma this is the very part affected, and the one which must first be removed.

and the vault of the vagina is wholly free, and even then only when the uterus yields to moderately strong traction exercised by a noose of thread, or, better, by the double forceps of Muzeux. The uterus is then held in a fixed position by a force applied above the site of the incision, the tumor cut off with the knife or scissors, and the wound thoroughly cauterized with the hot iron. This last we are absolutely required to do, although we believe that we have operated in perfectly healthy tissue, for microscopic cancer-nests may have pushed quite far into tissue otherwise healthy.

If the operation has to be performed *in situ*, it is best to divide the cervix by the wire *écraseur* or the galvano-caustic loop, unless we wish to employ the sharp spoon, to be presently described; for the chain *écraseur* must decidedly be rejected, as it is apt to tear off at the same time the neighboring mucous membrane. The operation, however, cannot be performed, under these circumstances, with the knife and scissors, without considerable loss of blood, and this, as a rule, must be strictly avoided. The cut surface, even when made by the wire, and when it does not bleed, must likewise be cauterized with the hot iron.

It is true that cases very rarely make a perfect recovery, even when operated on under these conditions.

The following cases of complete recovery after operation on pedunculated carcinoma have been witnessed: Ziemssen, Virchow's Archiv, 1859, Vol. 17, p. 333 (death from pneumonia after seventeen years); C. Mayer, Langenbeck, Martin, M. f. Geb., Vol. 18, p. 16; Mikschik, Zeitschr. d. Ges. d. Wiener Aerzte, 1856, p. 52 (death from cancer of the stomach after ten years); Simpson, Clin. Lec. on Diseases of Women. Edinb., 1872, pp. 178 and 199 (destructive cauterization by sulphate of zinc); Boulton, e. l., p. 201 (destroyed by chloride of iron); Barker, loc. cit. (acid nitrate of mercury); Weatherby, New Orleans J. of Med., Oct., 1869; Mettauer, Boston Med. and Surg. Jour., March 10, 1870 (acid nitrate of mercury); Scharlau, Berl. Beitr. z. Geb. u. Gyn., II., p. 23; Martin, Berl. klin. Woch., 1873, No. 28 (two cases); Byrne, Amer. Jour. of Obstet., V., p. 727, and VI., p. 112; and my own case, represented in Figs. 96 and 97.

If the disease has advanced further, so that the neoplasm has gone high up in the cervix, or has extended to the connective tissue of the vault of the vagina, the chances of preventing relapse

by a radical removal are very slight. Still, in view of the dreadful prognosis of an advancing carcinoma, it appears to be our urgent duty always to make a new attempt at complete extirpation of the cancerous infiltration in all cases that offer any prospect of improvement. It is so much the more indicated because, even in case of further development of the carcinomatous portions which are left behind, a very complete removal of the degenerated masses, with subsequent cauterization, has a decidedly favorable effect upon the course of the disease. Not only is there a cessation of the hemorrhages and ichorous discharge for a considerable time, and also, in some cases, a remission of the pain, but if the removal and cauterization have been thorough, the new growth, as a rule, makes slower progress.

The knife and scissors certainly are not alone sufficient for such a thorough extirpation, for the neoplasm penetrates into the healthy tissue in wholly irregular processes.

The best mode of operating is to remove as much of the tumor as possible by some one of the methods in use, and then to endeavor to destroy the remaining parts by caustic. With the view of destroying, at the same time, as little healthy tissue as possible, we must select such caustics as act particularly upon epithelial formations, upon the carcinomatous masses in fact, and less upon connective tissue. As such an article Simpson¹ formerly made use of sulphate of zinc. Skene² recommends the chloride of zinc, of which he makes up a paste with starch, and inserts small pieces of this, when dried, into incisions in the diseased parts. I have been employing, for over a year, the local treatment by means of an alcoholic solution of bromine, as proposed by the English; it has produced such admirable results that I can recommend it with the fullest confidence. I use this treatment in all cases in which the destruction of tissue is not already too considerable, because this caustic, as shown by the investigations of Henneberg,³ has the property of acting with especial destructiveness upon the cancer-nests, and because I have seen relatively superior results from its use.

¹ Med. Times, Jan. 17, 1857.

² Amer. Journ. of Obsts., II., p. 218.

³ Dis. inaug. Erlangen, 1874.

Routh¹ first recommended the alcoholic solution of bromine against carcinoma uteri, in 1866. He mixes ten parts of alcohol with one part of bromine (which must be done carefully for fear of explosion), soaks tampons with this solution, and applies them to the cut surface, leaving them pressed against the part for forty-eight hours. Wynn Williams² employs one part of bromine to five of alcohol, and in case of a superficial carcinoma applies this mixture, with a tampon of cotton, to the ulcerated spot, or, in case of more solid growths, injects it into the tumor itself. In the former case he covers the tampon with india-rubber, and allows it to remain for a variable length of time—from ten minutes to two hours,—after which he uses vaginal injections of the bromine solution very much diluted. He protects the organs of smell by small pledgets of cotton soaked in a solution of soda. The strong solution gradually loses its color, but, according to Wynn Williams, does not lose its efficacy, a statement which my own experience forces me to consider highly questionable.

Where the carcinoma is more advanced, we proceed with the operation in the following manner:

If the carcinomatous infiltration of the cervix and its surroundings no longer permits of the artificial prolapsus, the operation must be performed *in situ*. If tumors of considerable size are present, they must be removed as thoroughly as possible by the scissors, the wire *écraseur*, or the galvano-caustic loop. In the absence of such tumors, and where we are dealing more with cancerous ulcerations than with a new growth, or where perhaps



FIG. 102.
Simon's sharp spoons.

the degenerated cervix forms such a short stump that it cannot well be got at, we can employ, with great benefit, Simon's sharp spoons (see Fig. 102) to scrape away as much of the neoplasm as possible. In cases in which the carcinoma has rather a medullary character, this makes very thorough work, so thorough, in fact, that we cannot employ the hot iron afterwards, as we may have already forced our way with the spoon into dangerous proximity to the bladder, rectum, and peritoneum. I have penetrated so far with the spoon that the newly

formed excavation was for a considerable space separated from the bladder, as well as from the rectum, only by the intact

¹ Lancet, 1866, II., No. 17; London Obst. Tr., 1867, Vol. VIII., p. 290; and Brit. Med. Jr., Feb. and March, 1870.

² London Obst. Tr., Vol. XII., p. 249.

mucous membranes of those organs. But if the connective-tissue constituents are more largely present in the neoplasm, we cannot so well scrape away the masses with the spoon, for the connective tissue of the tumor offers the same resistance as the normal tissues. In these cases, especially if it is easy to feel portions of the neoplasm that have been left behind, I employ the hot iron in the most thorough way immediately after the extirpation. One iron after another (ordinarily from twenty to thirty) is applied to the parts that are left, until all the diseased tissue seems to be burnt away, and a deep crater made in the cervix.

So soon as the eschar begins to separate, the concentrated alcoholic solution of bromine (one part bromine to five of alcohol) is applied to the wound, so as to destroy, as far as possible, the remaining cancer-nests which have entered the healthy parts. A tampon of cotton, well soaked in the solution, is pressed against the wound, and retained in place by another tampon covered with bicarbonate of soda. The bicarbonate of soda neutralizes the bromine which escapes, and thus prevents any excoriation of the vaginal walls. Still it is not necessary to guard with too great care against the sound parts being moistened by the bromine solution, for it only burns the mucous membrane, and never causes any deeper destruction. Whilst formerly I allowed the bromine tampon to remain for but a short time in contact with the surface of the wound, I now allow it to stay for twenty-four hours.

If sizable knobs of the cancer are still left behind, or if new growths show themselves, I inject the bromine solution with a hypodermic syringe, furnished with a long needle, directly into the parenchyma of the neoplasm, in exactly the same way as it has long been recommended to do with acetic acid or nitrate of silver in solution. After this, quite large pieces of the neoplasm are cast off in a gangrenous state.

I repeat the application of the caustic at intervals of at least eight days, and between times use injections of a weak solution of bromine—say of bromine one part, alcohol five, distilled water five hundred.

Sharp spoons have formerly been employed for other purposes, as by Sédillot for scraping out carious bones, and by Volkmann for scraping away ulcers. Réca-

mier proposed his curette for scraping away simple granulations from the inner surface of the uterus. Sir James Y. Simpson, too, according to a note by Alexander R. Simpson, the editor of the *Clinical Lectures on Diseases of Women*, was in the habit of scraping away, with the finger-nails or a curette, carcinoma which was already far advanced, so as to check the local progress of the neoplasm, and enable patients to recover from the exhaustion caused by the discharges. Lately Simon¹ has recommended a set of sharp spoons, of various sizes, for scraping away carcinoma from the cavities of the body; and we must admit that this process is one easily employed, certain, and comparatively free from danger, for the spoons scrape away only the carcinomatous and not the healthy tissue. Munde² also has made favorable experiments with them.

It still remains uncertain whether a radical cure will be effected more frequently by the proceeding we have described than by the methods hitherto in vogue. In one case (see Figs. 96 and 97) the patient recovered, and has as yet, after a year and a quarter, had no relapse, though, to be sure, being a cancrroid, which was pedunculated, and sprang from the anterior lip, it presented a favorable opportunity. In another case, in which the infiltration had already in part extended to the pelvic connective tissue, the patient died from a peritonitis unconnected with the operation, and at the autopsy no further trace of cancerous structure was found under the microscope. In the cases which I have since treated in this way, it is true I have not again obtained a perfect cure, but in all of them the degeneration had already extended high up in the cervix and far into the pelvic connective tissue.

This much, however, is certain from what I have seen, namely, that the bromine solution has a most excellent local effect. I have even attained a perfect local cure in the above-mentioned case, where an enormously broad wound was made with the sharp spoon, extending to the bladder and rectum, so that on examination with the speculum nothing but healthy mucous membrane was to be seen, while, however, the neoplasm was still advancing in an upward direction. Such a local result cannot be too highly esteemed, for the hemorrhages and fetid discharge cease, and, as a result, the nutrition is essentially improved, and the strength increases.

¹ Berl. Beitr. z. Geb. u. Gyn., 1872, B. I., p. 17.

² Amer. Jour. of Obst., V., p. 309.

I am therefore most decidedly in favor of a thorough operation, even in cases where we cannot hope to remove all the diseased tissue, and I cannot agree with Spiegelberg¹ that the depressing influence of the operation is greater than the advantage gained by it; on the contrary, I consider the operation as precisely indicated by the hemorrhages, for generally the very moderate loss of blood during the operation is less than otherwise occurs in the space of a few days, and the spontaneous hemorrhages are with greater certainty checked for a considerable time by the operation.

Even by simple amputation, with subsequent energetic application of the hot iron, extraordinary results are often obtained, for the intense cauterization may so change the character of the tumor that actively growing and rapidly ulcerating forms of medullary cancer become firmer scirrhus forms. To this end it is, of course, necessary that the hot iron be vigorously used, so that the wound may heal with a firm cicatrix, for the iron, when only superficially used, merely acts as a new excitant to increase the luxuriant growth.

Still better results have been attained by the after-treatment with bromine, for in this way the chances of radical removal are improved, and, in any event, the local healing takes place with wonderful rapidity. This treatment is no longer applicable when the destruction has made marked progress, particularly if perforations into the bladder or rectum are already present or threatening.

In such cases, as well, of course, as in those where operative treatment is not considered to be indicated, or is not consented to, we must meet the symptoms in another way.

The most dangerous ones are the hemorrhages, and these can only be averted for any length of time by operation. If that is out of the question, a solution of the chloride of iron is the most efficient resource. The most convenient and energetic way of using this is simply to pour the fluid into a milk-glass speculum, in the upper end of which the cancerous growths are engaged, and allow it to act for some minutes. Inconsiderable hemor-

¹ Arch. f. G., Vol. V., p. 411.

rhages may be arrested by the injection of cold water and vinegar; the advantage of this proceeding being that patients can use it themselves. The same is the case with diluted solutions of chloride of iron. Even suppositories of tannin may check slight hemorrhages. The internal administration of chloride of iron, ergot, and the like, is of but little use in these hemorrhages, and the use of the tampon is not to be recommended, because it is generally effective only so long as it remains in position, and because it increases the ichorous discharge.

Very imperfect success attends the effort to disguise the offensive smell of the ichorous discharge by means of substances with an agreeable odor. It is decidedly moderated by taking pains to syringe out the vagina frequently, so that the secretion does not stagnate. If we employ disinfecting substances for this purpose, such as bromine, carbolic acid, or permanganate of potash, we may succeed, even in extensive ulceration, in making the condition of patients endurable in this respect. The bad effects which follow the excoriation of the vulva and inner surfaces of the thighs by the fetid secretion, are prevented no less by these injections than by the closest attention to cleanliness and by lukewarm sitz-baths.

Pain, which is the most unendurable symptom present in many cases, is in general to be treated in the ordinary way. Still, it is well not to accustom patients to the use of morphine until as late as possible, for the most incredible quantities of this drug are often required when the later stages of the disease are much prolonged. Besides the internal and subcutaneous use of morphine, rectal suppositories containing it are particularly recommended, or small clysters (of about one and a half fluid ounces) containing from ten to fifteen drops of the tincture of opium. Chloral, too, will often procure a quiet night's rest.

In these very cases of carcinoma of the uterus, iodoform has been recommended by Demarquay, Barker,¹ and Völker.² Suppositories made up according to the formulas mentioned are to be inserted into the vagina.

¹ Loc. cit. Iodoform, gr. x.; but. cacao, 3 i.; glycerine, gtt. v.

² Bull. gén de thérap., 1869, Dec. 15. Iodoform, gr. viij.; but. cacao, 3 ijss.

It is moderately useful in some circumstances to allow vapor of chloroform or carbonic acid gas to flow into the vagina.

It is particularly important in cases where considerable cancerous masses encroach upon the calibre of the rectum to exercise continual care to secure soft fæces. Attention must also be paid to the urinary secretion. When the quantity of urine is remarkably small, before vomiting occurs, I recommend the drinking of large quantities of carbonic-acid water, or order other diuretics. The loss of strength and the establishment of the cancerous cachexia may often be long prevented if we are careful to secure good nutrition by moderate exercise, by stay in the fresh air, and invigorating food, and, at the same time, to check the loss of nutrient fluids through hemorrhagic and serous discharges, in the ways already recommended.

CARCINOMA OF THE BODY OF THE UTERUS.

Simpson, Edinb. Med. J., April, 1864, and Select. Obstet. and Gyn. Works. Edin., 1871, pp. 763 and 768.—*Szukits*, Zeitschrift d. Ges. d. Wiener Aerzte, 1857, p. 414.—*Strobel*, Ein Fall von Carcinom des Uterusgrundes. Diss. Inaug. Erlangen, 1857.—*Wagner*, Der Gebärmutterkrebs. Leipzig, 1858, p. 122.—*Förster*, Scanzoni's Beitr., 1860, IV., p. 30.—*Saxinger*, Prager Vierteljahrs., 1867, 1, p. 118.—*Blau*, Einiges pathol.-anat. über den Gebärmutterkrebs. Diss. Inaug. Berlin, 1870 (Fall 17, 32, 33, 34, 51, 88).—*Spiegelberg*, Arch. f. Gyn., Bd. VI., p. 123.

In the first place, we will remark that it is extremely difficult to present a picture of carcinoma of the body which shall be at all trustworthy, from the very few observations we have which are to be depended on. Besides two, observed by myself, I have hunted up from the literature of the subject a series of cases which seem to be trustworthy, and from them I sketch the features of the disease.

Etiology.

It is certain that carcinoma of the body is of extreme rarity, compared with that of the cervix. It is very difficult to speak more fully about its frequency, because, on the one hand, the reports of observers differ very much, and, on the other, the more

frequent sarcoma of the body of the uterus has not seldom been confounded with carcinoma. Szukits asserts that out of four hundred and twenty cases of carcinoma of the uterus, treated in the female division of the hospital at Vienna, only one was found in the body, while Blau describes six out of ninety-three cases. Inasmuch as the rarer cases come more frequently under the observation of clinical teachers than ordinary ones do, the reports of autopsies only are useful in determining the frequency of this neoplasm. If we add together the numbers given by Blau, Eppinger, Szukits, Lebert, and Willigk, we find that of 686 carcinomata of the uterus, thirteen, or not quite two per cent., had their seat in the body.

Carcinoma of the body is, far more than that of the cervix, a disease of advanced life, since in the great majority of cases it first occurs after the menopause. I find that in eighteen well-marked cases, in which the ages are given, no single case was younger than forty years; only six were between forty and forty-nine; nine between fifty and fifty-nine, and three between sixty and seventy. A very important etiological difference from carcinoma of the cervix, moreover, consists in this, that, like sarcoma, the malignant disease of the body occurs with striking frequency in nulliparous women. Out of thirteen cases, in which statements are made on this point, five had never borne a child; one had borne a child once; three, twice; one, three times, and three are simply indicated as multiparæ.

Pathological Anatomy.

Carcinoma of the body of the uterus is met with under two different forms. It occurs either in circumscribed roundish foci in the parenchyma of the uterus, or as a diffuse carcinomatous infiltration, which gradually involves the whole body and fundus. The round nodules of the first form are of the size of a hazel-nut, a walnut, or larger; they very readily become softened, and, when broken down from necrosis, sometimes perforate into the cavity of the uterus, where they can be felt as friable masses, and are gradually cast off. Sometimes they make their way outwards, instead of inwards, and then the per-

foration is very commonly preceded by adhesions to adjacent organs, or may be shut in by pseudo-membranes. On the other hand, acute peritonitis, from perforation, often occurs with a fatal result. There may, however, be adhesion to and perforation into various parts of the intestine or into the bladder; in fact, by these excluding pseudo-membranes a completely new, sac-like space may form between the posterior wall of the pelvis and the symphysis, in which lie the broken-down masses shut out from the abdominal cavity, so that gradually almost the whole body of the uterus may be destroyed, and in its stead may be found a newly formed cavity, with gangrenous contents.

The diffuse infiltration of the body of the uterus (see Fig. 104) undergoes destructive disintegration much less readily, so that here we find a much greater formation of carcinomatous tumors. Still, the mucous membrane of the uterus being forced together from every direction, soon becomes necrotic, and thus the starting-point of the suppuration and necrosis of the neoplastic masses is the uterine cavity.

Carcinoma may extend, secondarily, by direct propagation, to the cervix, as well as to all the rest of the neighboring organs, such as the peritoneum, bladder, intestine, tubes, or ovaries. There are also frequent metastases to other organs, especially the vagina, the glands, and the ovaries.

Symptoms.

As in the case of carcinoma of the cervix, the first symptom is apt to be a *hemorrhage*. Besides this, there is almost invariably an offensive *discharge*, sometimes abundant and watery, in other cases more puriform. But the discharge may also be like the washings of meat, and not in the least degree fetid, and the hemorrhages and discharge may even be almost completely absent. The secretion becomes most offensive when the softened carcinomatous nodules are emptying themselves into the cavity of the uterus, and being gradually expelled from it, as they are by pains resembling those of labor.

The *pains*, too, may behave in various ways. In many cases

they are wholly wanting, or there are no pains which are at all peculiar to carcinoma, but only such as are caused by other uterine tumors: especially pains in the back, and often severe pains in one or both of the lower extremities. The paroxysms of pain of great intensity, occurring at a certain hour of the day, which Simpson represents as characteristic of carcinoma of the body of the uterus, are not, strictly speaking, frequent; they are to be considered as uterine colic, called forth by the abnormal



FIG. 103.

Carcinoma of the body, which has increased the size of the uterus uniformly.

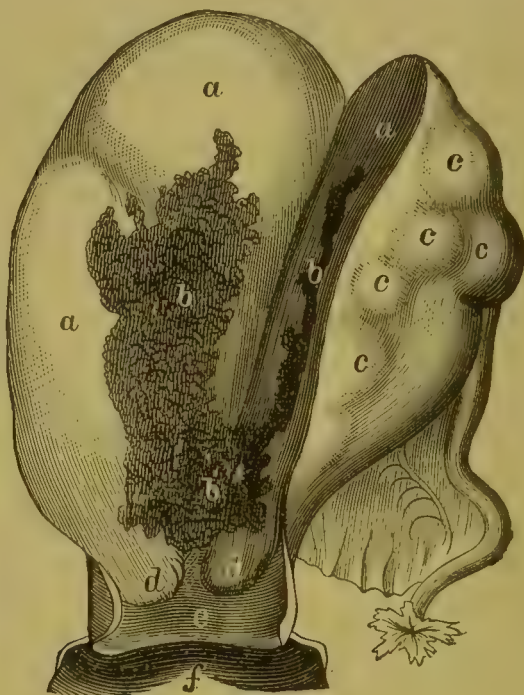


FIG. 104.

Carcinoma of the body. The case shown in Fig. 103. after the suicide of the patient, which occurred two months later.

a, carcinomatous new formation; *b*, breaking down of the same; *c*, nodules of cancer projecting somewhat outwards; *d*, lower border of the new formation; *e*, lower part of the cervix in normal condition; *f*, vagina.

contents of its cavity. These contents may consist of cancerous masses discharged into the cavity of the uterus, though the new growth itself may also act as abnormal contents, distending the organ powerfully by its development; or the canal of the uterus may be so obstructed by the neoplasm that the secretion of the mucous membrane is retained.

To these are subsequently added the pains of peritonitis,

which arise if the neoplasm invades the serous investment of the uterus.

On examination, the uterus is found, even at the beginning, moderately enlarged (see Fig. 103); later on, single, knob-like prominences may make their appearance on it, or it may no longer be distinctly outlined, owing to the numerous adhesions with the neighboring organs. The increase in size is generally but moderate, but it may attain a size equal to that in the later period of pregnancy.

On internal examination, the cervix is usually found to be unaltered; but it may also be permeable, or at all events be capable of being easily dilated, so that in such a case the carcinomatous masses always present in the cavity may be felt, and portions removed.

The reaction upon the general condition often does not occur till quite late, so that in the beginning the nutrition may be perfectly good.

Diagnosis.

Great difficulties are often presented in recognizing the new growth as malignant, unless fragments of the tumor have escaped from the cavity of the uterus. If we have uniform enlargement and no fetid discharge, the tumor can be easily distinguished as a fibroid. Yet, in the case represented in Fig. 103, in which there was no offensive discharge, I was able to fix upon the diagnosis of a malignant neoplasm, because the uterus, uniformly enlarged, exhibited a very remarkable, tense, firmly elastic distention, such as I had never felt with fibroids, but only in hæmatometra and hydrometra. Now, inasmuch as the latter could be excluded with certainty, and as I could assume *a priori* that a malignant neoplasm would distend the uterine walls more forcibly than a benign one, I diagnosticated a sarcoma; at the autopsy, however, which was made at quite an early stage, owing to the suicide of the patient, the carcinomatous infiltration was found which is shown in Fig. 104.

It still further indicates a malignant neoplasm if the uterus, having at first been uniformly enlarged, acquires irregular protuberances and contracts adhesions with neighboring organs.

The diagnosis becomes easier if a fetid discharge sets in. Nevertheless, the diagnosis of a malignant neoplasm is not even then certain, for we may have to deal with a fibroid undergoing destructive degeneration ; and even if everything is in favor of the malignancy of the tumor, still sarcoma of the mucous membrane of the uterus may furnish perfectly analogous symptoms, so that carcinoma cannot be diagnosticated positively until pieces of the growth can be placed under the microscope.

Treatment.

These patients, being doomed to certain death, are only to be treated symptomatically, for the seat of the evil cannot be reached. At all events, it must for the present be left wholly undecided whether and how far the extirpation of the uterus by laparotomy is justifiable when the diagnosis is established with certainty at an early stage. Such a procedure is rational, if the new growth has attacked the body only, since then we may hope to remove the malignant neoplasm completely by an operation which, while certainly dangerous, is not necessarily absolutely fatal.

The discharge, if fetid, cannot be deprived of this quality, so that we are limited here to the protection of the vagina and external genitals from the irritating effect of the ichorous secretion by means of purifying injections.

In many cases, however, it becomes our duty to assist the efforts of nature to expel the masses which have escaped into the cavity of the uterus, by dilating the cervix with sponge-tents, and by removing any portions of the neoplasm within reach by the finger or the sharp spoon. In this way a remission of the worst symptoms, such as the ichorous discharge, the pains and hemorrhage, is often secured, and a week, or even a month, of steady improvement gained.

SARCOMA OF THE UTERUS.

Mayer and Virchow, M. f. Geb., Bd. 13, p. 179.—*Virchow*, Die krankhaften Geschwülste, Bd. II., p. 350.—*L. Mayer*, M. f. Geb., Bd. 17, p. 186.—*Hardy*,

Dublin Journal, May, 1864.—*Ahlfeld*, Wagner's Archiv f. Heilk., 1867, p. 560.—*Veit*, Frauenkrankheit., 2 Aufl., p. 413.—*West*, Lectures on Diseases of Women. London, 1864.—*Langenbeck*, M. f. Geb., Bd. 15, p. 173.—*Scljphasowsky*, Virchow-Hirsch'scher Jahresbericht über 1868, p. 604.—*Gusserow*, Arch. f. Gyn., Bd. I., 2, p. 240, and über Uteruscarcinom in Volkmann's klin. Vortr., No. 18, p. 117.—*Hegar*, Arch. f. Gyn., Bd. II., p. 29.—*Winkel*, Arch. f. Gyn., Bd. III., p. 297.—*Spiegelberg*, Arch. f. Gyn., IV., pp. 344 and 351.—*Chrobak*, Arch. f. Gyn., IV., p. 549.—*Rabl-Rückhard*, Berlin. Beitr. z. Geb. u. Gyn., Bd. I., H. 2, p. 76.—*Kunert*, Ueber Sarkoma uteri. Diss. Inaug. Breslau, 1873, and Arch. f. Gyn., Bd. VI., p. 111.—*Müller*, Arch. f. Gyn., Bd. VI., p. 126.

Sarcoma of the uterus occurs in two forms, which are quite distinguishable from one another in their pathological anatomy as well as clinically, and we agree with Waldeyer in regarding it as a pure connective-tissue tumor. One form is sarcoma of the mucous membrane, which forms diffuse growths whose tendency is to encroach upon the cavity of the uterus, and the other is sarcoma of the uterine parenchyma, which develops in a way precisely similar to myoma and polypi of the uterus, and which we shall consequently designate as fibroid sarcoma.

Sarcoma of the Mucous Membrane.

Etiology and Mode of Occurrence.

The causes of its formation are completely unknown.

We find in the literature of the subject sixteen cases which undoubtedly belong in this category, in which the nature of the tumor was fully established by microscopic examination. Still to this neoplasm belong by far the greatest number of those not very rare cases in which villous papillary "cancer-masses" have either been removed from the cavity of the uterus or found in it. Typical cases of this kind are to be found, *e.g.*, in Simpson.¹

Sarcoma seems to occur at every period of life from puberty onwards. Among the sixteen cases just mentioned there was one patient of fifteen years and one in her twentieth year, three were between thirty and thirty-nine, four between forty and forty-nine, five between fifty and fifty-nine, and one each of

¹ Diseases of Women, p. 764, Cases I. and II.

sixty and sixty-one years. Among fourteen patients, where the history touched upon this point, eight (!) had never borne a child.

Pathological Anatomy.

The sarcomatous proliferation appears in these cases to spring from the submucous connective tissue of the cavity of the uterus, or, as in the sixth and eighth of Spiegelberg's cases communicated by Kunert, from the cervical mucous membrane. Under the influence of a new growth of small, round, rarely spindle-shaped cells, a soft, flabby, or villous tumor develops, which grows inwards into the cavity of the uterus. Thence it may be expelled into the cervix or vagina by the contractions of the uterus. It generally ulcerates only at a late stage, and perhaps only in consequence of the pressure exerted by the uterine walls. Sarcoma of the mucous membrane may, however, destroy the wall of the uterus secondarily by further proliferation and by destructive pressure upon it, or even by direct infection. Gusserow's¹ case is very strange, and it certainly belongs here, and not to the next variety. In that case a soft neoplasm, springing from the uterine mucous membrane, grew through the upper wall of the uterus (apparently by infection of that part) into the abdominal cavity, where, separated from the other organs by an enveloping sac, it broke down, and ultimately perforated into the intestine and through the abdominal walls.

The formation of metastases is rare.

Symptoms.

Here, too, the first symptoms consist of hemorrhages and a watery discharge. The latter may be astonishingly abundant, but it is only toward the last that it has a very offensive smell. In the first stage it is more like the washings of meat, stale or slightly offensive.

The pains may be entirely absent or quite insignificant. Only when the uterus prepares for the expulsion of the new

¹ Loc. cit., p. 242.

growths, do pains like those of labor set in in the back and abdomen.

On examination we find the uterus moderately enlarged, sometimes only slightly thickened, the cervix usually closed. This latter may, however, open enough to allow of the passage of the finger, and to permit us to feel the soft masses of the tumor in the uterine cavity, or these may themselves project in considerable masses through the dilated cervix into the vagina. In the latter case, the uterus may even be secondarily inverted, as shown by cases of this kind reported by Langenbeck and Spiegelberg.

Diagnosis.

The diagnosis cannot be established with certainty until masses which have been expelled or have scaled off can be placed under the microscope. Still, in view of the infrequency of carcinoma, we shall not be likely to go astray in our diagnosis, if, with moderate enlargement of the uterus and a discharge of blood, or one resembling the washings of meat, we feel soft masses of tumor through the dilated cervix—provided we can exclude a retained placenta, with which it might very easily be confounded. Without a thorough microscopic examination it is also difficult to avoid confusion with benign hyperplastic growths of the uterine mucous membrane, which present a tissue like the decidua, very similar histologically to carcinomatous tissue. Such tissue as is due to development of the uterine glands also presents an appearance under the microscope more resembling carcinoma. Such cases have been described by Slavjansky and Duncan¹ and by Gusserow.²

Prognosis.

The prognosis is indeed fatal in every case, although, by removing the soft tumor from the uterus, we may avert the bad symptoms for a considerable time and retard a second formation

¹ Edinb. Med. Journ., Aug., 1873, p. 97, and Obst. Journ. of Gt. Brit., Nov. 1873, p. 497.

² Loc. cit., pp. 246 and 247.

of the masses. If the cervix is closed, it must be dilated artificially, and as much as possible of the growth removed with the fingers, the curette, or the sharp spoons.

Sarcoma of the Parenchyma of the Uterus.

Etiology and Mode of Occurrence.

The formation of the *fibroid sarcoma* appears to be due in some way to the presence of a round fibro-myoma or a fibrous polypus. At any rate, it not unfrequently proceeds from a degeneration of these. Under what conditions this occurs, however, is wholly unknown to us. From the mere fact of its similarity in external character to the myomata, it has also been regarded as a recurrent fibroid.

Fibroid sarcoma does not occur by any means so exclusively in advanced life as does carcinoma of the body of the uterus; but in this, too, it has much greater analogy to the fibroid. We find that among eighteen patients one was indicated as young, two were between 20 and 29, five between 30 and 39, eight between 40 and 49, one between 50 and 59, and one was over 60 years old.

Among fourteen patients three had never borne a child, three had had one child, and three others three children each; there was one who had had two children, one five, and one six, and two were simply indicated as multiparæ.

Pathological Anatomy.

The fibroid sarcoma has the same predilection for the body of the uterus as the fibro-myoma, yet it may also, like the latter, arise from the cervix. It forms round or cylindrical tumors of considerable size, which are quite constantly seated in the submucous tissue. The tumor is soft, and usually springs with a broad stem from the parenchyma of the uterus, with which it is continuous; upon section the cut surface appears pale, moist, and homogeneous, and reflects the light uniformly. All forms of sarcomatous polypi not having a very broad pedicle probably

always spring from degenerated fibrous polypi; at all events in the two cases referred to below I found the pedicle almost purely fibro-myomatous, with scarcely any suspicious admixture.

On microscopic examination, we find the tumor either composed largely of the normal constituents of the fibro-myoma, with here and there, scattered throughout the mass, centres of cell-growth (round, or, in this form, very frequently spindle-shaped cells); or these centres of cell-growth constitute the entire mass of the tumor, being separated from each other by only scanty trabeculæ of connective tissue.

The tumors have no tendency to break down, although, like the fibrous polypi, they may be spontaneously expelled. Consequently they sometimes attain a very considerable size. In a case which is still under my observation, where the diagnosis is scarcely open to question, although not yet confirmed by microscopic examination, the tumor reaches from the entrance of the vagina to above the navel. These tumors may extend by continuity to the surrounding tissues and also, by metastasis, involve the lymphatic glands or other organs.

Symptoms.

In its symptoms the fibroid sarcoma entirely corresponds to the fibrous polypi; in fact, the resemblance in its whole character may be so complete that the homogeneous appearance of the section of the tumor may be the first thing to call attention to its malignant nature.

There are *hemorrhages*, as a rule, occurring either as menorrhagia or metrorrhagia, and besides these, not infrequently other discharges, generally resembling the washings of meat, but at times somewhat purulent. This discharge has of itself no ichorous offensive character, though it may become fetid, just as in the case of fibrous polypi, if the mucous membrane ulcerates.

The tumor is not necessarily characterized by *pain*, so that sometimes its whole course is painless. But pains like those of labor usually occur in the back and loins when the uterus endeavors to expel the polypus. In the case mentioned above, when the tumor had attained an enormous size, there occurred

paroxysms of the most intense pain, which, however, were due to attacks of uterine colic caused by retention of the purulent secretion of the uterine cavity.



FIG. 105.

Sarcomatous polypus (*SP*) lying in the carcinomatous cervix (*c*).
oi, os uteri internum.



FIG. 106.

Sarcomatous polypus (*S*) the size of a child's head.

We cannot better describe the state of things than by recalling what occurs in the case of polypi. The uterus is enlarged, and under its contractions the polypus is gradually forced through the cervix. The pedicle is narrow only in exceptional cases; as a rule, it has a broad base, continuous with the parenchyma of the uterus. The tumor may subsequently, by irregular development, form a large abdominal tumor.

The case represented in Fig. 105 has an unusual interest, because a spindle-cell sarcomatous polypus, having a narrow fibrous pedicle, and springing from immediately above the os uteri internum, lay in a cervix which was the seat of carcinomatous degeneration. After the excision of the sarcoma the carcinomatous degeneration made further progress, a vesico-vaginal fistula was formed, as well as metastases in the lymphatic glands and the lungs, and thus death resulted.

The other sarcomatous polypus (also a spindle-cell sarcoma), represented in Fig. 106, occurred in a woman fifty-four years old; I tied it off with a wire loop, on the

16th of October, 1873. The pedicle consisted of almost pure fibrous tissue, with a few scattered masses of cells. I learn by a letter from the physician in attendance, dated June 2, 1874, that the condition of the woman is most excellent. The uterus is rather low down, and has to be retained by a ring. It is somewhat heavy, but not materially increased in size; the os is closed, the periods occur every four weeks, lasting three or four days without pain. Its further progress will be watched.

Diagnosis.

The remarkably soft consistency of the polypus, its cylindrical form, and its implantation with its full breadth on the internal surface of the uterus, are opposed to the idea of a fibrous polypus, and in favor of a sarcoma, and so is its rapid growth. The irregular growth, too, without regard to the limits of the organ, a feature which does not belong to benign tumors, in one case enabled me to make the diagnosis at quite an early stage.

Prognosis.

The final issue is that of all malignant neoplasms, yet its course is much slower than in carcinoma. In sarcomatous degeneration of a fibrous polypus, recovery may take place if an operation is performed through healthy tissue, as is shown by Winkel's case.

The extirpation of the sarcoma is performed just as in the case of a fibrous polypus, though the pedicle must be cut through as high up as possible, and must be cauterized, if it is at all practicable, so as to prevent the further development of masses of cells which may have been left behind.

TUBERCULOSIS OF THE UTERUS.

Raynaud, Arch. génér., 1831, Vol. XXVI. p. 486.—*Holmes Coote*, London Med. Gaz., June, 1850.—*Geil*, Ueber die Tuberkulose der weibl. Geschlechtsorgane. Diss. Inaug. Erlangen, 1851.—*Paulsen*, Schmidt's Jahrb., 1853, Vol. 80, 11, p. 222.—*Snow-Beck*, etc., Pathol. Trans. London, Feb. 6, 1855.—*Kivisch*, Klin. Vortr., I., 4th ed., p. 557.—*Cooper*, Union méd., 1859, No. 54.—*Namias*, Annali univers. di medic. Milano Ag. i. Sett., 1858.—*Rokitansky*, Allg. Wiener med. Z., 1860, No. 21.—*Brouardel*, De la tuberc. des org. gén., de la femme. Paris, 1868.—*Klob*, Path. Anat. d. weibl. Sex., p. 191.—*Lebert*, Arch. f. Gyn., IV., p. 457.—*Courty*, Maladies de l'utérus, 2d ed. Paris, 1872, p. 987.

Tuberculosis of the uterus has such a wholly subordinate clinical significance that we may pass over it briefly.

It happens primarily with the very greatest rarity, and even secondary tubercular formations on the uterine mucous membrane are very uncommon. According to Dittrich, it occurred once among forty tuberculous women.

The tubercles appear in their ordinary form upon the mucous membrane of the cavity of the uterus, while in the cervix we but seldom meet with single nodules. They bring about the degeneration of the mucous membrane, so that an ulcer is formed, and a viscid whitish secretion collects, which gradually thickens into a cheesy pulp.

Symptoms.

Tuberculosis of the uterus produces such insignificant symptoms, viz., amenorrhœa and some discharge, and these have so little prominence, when other organs are involved, that they are overlooked. I have observed a case during life, which, however, sought aid from a gynecologist, not on account of the slight affection of the uterus, but for the marked tubercular peritonitis which simulated a uterine tumor. The left ovary, which was enlarged, and entirely filled with a viscid, cheesy mass, undoubtedly formed the starting-point of the infection.

Diagnosis.

For the same reasons the diagnosis is not as a rule established, although it may be in some cases where there is a sufficiently marked affection of the genital organs, together with evidence of tuberculosis in other organs. Questions of prognosis and treatment are quite irrelevant in view of the significance of other tubercular processes.

ECHINOCOCCI OF THE UTERUS.

Rokitansky, Handb. d. spec. pathol. Anatomie, 1842, Vol. II., p. 539.—*Klob*, Pathol. Anat. d. weibl. Sex., p. 195.—*Graily Hewitt*, Lond. Obst. Trans., XII., pp. 135 and 237.—*Freund* and *Chadwick*, Am. J. of Obst., etc., Feb., 1875.

Echinococci are found in the uterus with exceptional rarity. There is, to be sure, in the older literature a great deal of argument about bladder-worms in the uterus, but the whole thing refers to vesicular moles. In more recent times an actual case was observed by Rokitansky, and Graily Hewitt saw echinococcus cysts which were expelled from a married woman of thirty-five years, who had borne one child fifteen years before. The uterus was about the size of one in the second or third month of pregnancy. The cysts came away repeatedly, and contained the heads of echinococci. Diluted chloride of iron was injected into the uterine cavity, and the patient left the hospital after three weeks.

HYSTERALGIA.

Gooch, On Diseases peculiar to Women, New Syd. Soc. London, 1859, p. 156.—*Scott*, Edinb. Med. J., 1834, 121.—*Mackenzie*, London J. of Medicine, May, 1851.—*Tilt*, London Obst. Trans., X., p. 199.

By the name of hysteralgia, or neuralgia uteri, or, with the English, irritable uterus, is indicated a high degree of neuralgic pain seated in the uterus, which organ cannot, however, be shown to be diseased.

It is difficult to determine how frequently this disease occurs. There are severe pains in the neighborhood of the uterus in many local affections of the organ, even apart from the inflammations, as, *e.g.*, with fibroids, and not seldom with carcinoma. They sometimes have a decidedly neuralgic character, that is, the severity of the pains is strikingly at variance with the appreciable changes and complaints, which, as a matter of experience, these ordinarily occasion. If we are willing to regard these cases as hysteralgia, the affection certainly is not very unusual. As many authors have thought they found the basis of hysteralgia in the flexions,—especially the retroflexion of the uterus,—or in endometritis of the body, we must include dysmenorrhœa in this conception, or directly identify it with hysteralgia. It is far more rare for severe pains to occur without our being able to prove the existence of changes in the uterus by our present methods of investigation.

It is quite manifest that the sphere of hysteralgia, according

to the last conception, is not strictly defined, but will, perhaps, become constantly more restricted with the increase and completeness of our capabilities for diagnosis.

At present, however, cases still occur in practice which we cannot consistently call by any other name, where, apart perhaps from some wholly insignificant anomalies which are constantly met with unaccompanied by any pain, this intolerable pain is the only symptom of disease. It is difficult to decide whether these are to be considered as actual neuralgias of the uterus, or whether they are connected with palpable diseases of the uterine parenchyma, which, however, are not appreciable by our methods of examination.

As regards the etiological aspect of the question, a nervous irritability of the patients is generally present before the paroxysms of pain manifest themselves. Pronounced hysterical appearances are often present; indeed, all the features of hystericalgia have something allied to hysteria, especially in the want of correspondence which prevails between the symptoms and the pathological changes found.

As regards anatomical changes, it follows, from what has been said above, that the very absence of them is the characteristic of the disease.

The only symptom—though it is a very prominent one—is the pain, which, while continuously present, lights up from time to time into the severest paroxysms, without any cause, or under merely trivial provocation. Such exacerbations are evoked by slightly touching the vaginal portion, and this is more marked, commonly, at some definite point.

The patients may be considerably reduced by the incessant pain and the loss of rest at night.

The disease is often very obstinate, and lasts for years, until in some cases it yields after marriage or the occurrence of the menopause.

In the way of treatment, in spite of the many remedies employed, there is exceedingly little to be done with any prospect of benefit. The general and local use of narcotics afford only some momentary relief. Deep incisions into the cervix seem to have acted the best.

MENSTRUATION AND ITS DERANGEMENTS.

As a subject allied to the diseases of the uterus, we must refer to the derangements of menstruation, after premising some introductory remarks on the normal conditions of this physiological function.

In so doing, it is true that we abandon the plan, to which we have so far adhered, of considering the diseases of the separate organs on a basis of pathological anatomy, and we must not fail to recognize the fact that, in the gynecological manual of the future, menstruation and its derangements may no longer find a place, for menstruation itself is to be treated of in lectures on physiology, and its derangements must find their place as symptoms of the general lesions of nutrition or of the diseases of the various organs, but especially of the uterus.¹

In fact we have been obliged, in the majority of the diseases we have described, to mention as symptoms one or more of the disturbances of this function, such as amenorrhœa, menorrhagia, or dysmenorrhœa.

The importance of the subject, however, and the fact that we shall not otherwise be thoroughly able to treat correctly of the symptomatic significance of the disturbances of menstruation, excuse us for giving a detached though brief account of this important matter—normal menstruation.

NORMAL MENSTRUATION.

Alexander, Physiologie der Menstruation. Hamburg, 1841.—*Brierre de Boismont*, Die Menstruation, etc., von Krafft. Berlin, 1842.—*Pouchet*, Théorie positive de la fécondation, etc., 1842.—*Dufourd*, Traité prat. de la menstruation, etc. Paris, 1847.—*Bischoff*, Beweis d. v. d. Begattung unabh. period. Reif. u. Loslösung der Eier. Giessen, 1844, and Zeitschr. f. rat. Medicin, IV., 1.—*II. von Meckel*, Jenaer Annalen, 1849, Parts 1 and 2.—*Szukits*, Wiener med. Z., 1857, T. XIII.—*Pflüger*, Untersuch. a. d. physiol. Laboratorium zu Bonn. Berlin, 1865, p. 53.—*Raciborski*, Traité de la menstruation. Paris, 1868.—*Krieger*, Die Menstruation. Berlin, 1869.

¹ Perhaps membranous dysmenorrhœa forms an exception to this, and ought possibly to be considered merely as an exaggerated menstrual process; still, it also may have been caused primarily by a disease of the uterine mucous membrane.

By the terms menstruation, periods, or catamenia (in French : mois, menstrues, d'ordinaires, règles, époques, périodes) we indicate a hemorrhage from the mucous membrane of the uterus, which occurs at quite regular intervals, and during the whole length of the generative period, with the exception of the time actually required for the propagation of the species.

Nevertheless this sanguineous excretion is in itself no very important physiological process, but is only the most striking symptom of the congestion of the genital organs, which recurs at regular intervals.

The genital organs, from the time of birth up to about that when puberty begins, are so completely at rest that they scarcely change during this whole period, and the uterus of a girl of eleven or twelve years old hardly differs at all from that of an infant.

Only when the development of the other organs is well-nigh finished, do the genital organs enter upon a new phase of development. Although not absolutely proved, it is still in the highest degree probable that this further development is introduced by the growth of the Graafian follicles in the ovary. Probably Pflüger states most correctly the causal relation of the different processes which now occur, when he assumes that a slight but continuous irritation of the ovarian nerves is caused by the growth of the Graafian follicles, and that only when the combined irritation has attained a certain intensity does it act upon the central organs so as to produce a reflex effect in the form of an arterial congestion of the genitals.

This arterial congestion is, physiologically, the most important process. It has ordinarily, besides the general hyperæmia of the organs of the true pelvis, two results :

1. There is a rupture of one or more of the follicles, which have been already distended almost to bursting. This is *ovulation*.

2. Changes take place in the mucous membrane of the uterus, which result in a sanguineous excretion from it, and this is *menstruation*.

Ovulation, then, and menstruation only stand to each other in this relation, that they are both results of one and the same

cause, viz., the abundant supply of blood which is periodically furnished to the organs of generation, and this, of course, on its part, is due to the advancing development of the ova and Graafian follicles.

With regard to the more intimate relations of ovulation and menstruation, we still know very little that is certain. The generally accepted theory has hitherto been that the rupture of the follicle and the discharge of blood from the uterine mucous membrane took place at the height of the menstrual hyperæmia; that the ovum, being taken up by the Fallopian tube, made its way into the uterus, and if not impregnated was lost there, but if impregnated engrafted itself, as Pflüger expresses it, upon the raw surface of the mucous membrane. Meanwhile, from the very important investigations of Kundrat and Engelmann,¹ certain new views are assuming great prominence. These authors consider that the menstrual hemorrhage is a process already retrogressive, under which the superficial layers of the mucous membrane, having undergone fatty degeneration, are being exfoliated. We must then admit, if these views are correct, as seems exceedingly probable, that with the appearance of the menstrual hemorrhage the generative processes of the period in question are brought to a close, and that a conception occurring at any moment after this time must be due to a newly discharged ovum which embeds itself in the mucous membrane as it is newly formed.

According to this, the processes of ovulation and conception must be looked upon as follows:

The growth of the ovum and Graafian follicle occasions an irritation of the ovarian nerves, which at quite regular periods calls forth as a reflex phenomenon a slowly developed hyperæmia of the organs of generation. One result of this hyperæmia is the rupture of the Graafian follicle, which generally, that is when there are ripe follicles, takes place at the beginning of the arterial hyperæmia. The second result is a proliferation of the mucous membrane of the uterus. If the ovum received from the Fallopian tube is not impregnated, it is lost, and, with the grad-

¹ Stricker's med. Jahrb., 1873, 2d Part, p. 139.

ual recession of the hyperæmia, the topmost layers of the mucous membrane of the uterus undergo fatty degeneration, exfoliate, and by their detachment cause a laceration of the superficial vessels of the mucous membrane and consequent hemorrhage. If, however, the ovum has encountered healthy spermatozoa, and has been impregnated by them, it fastens itself firmly in the tumefied mucous membrane of the uterus, acts as a powerful stimulus upon it, so that its fatty degeneration does not occur at this time, but only after some 270 days, at the end of the pregnancy, and so the occurrence of the hemorrhage is prevented, or rather postponed, for this length of time.

Among the very important changes which would on this theory be introduced in the views hitherto held, would be that every impregnated ovum does not proceed from the ovulation of the last menstruation, and that the ovum discharged on this occasion would rather be the last one lost (unfructified), while the impregnated ovum would be from the following ovulation, with which no further menstrual bleeding is connected. Löwenhardt¹ has also arrived at this opinion from considerations drawn from the calculation of the duration of pregnancy, and it cannot be denied that there is much in favor of it.

The analogy between menstruation and labor thus becomes almost complete, especially if further observations should establish that the unimpregnated ovum also embeds itself in the proliferated uterine mucous membrane. There exists but one direct observation in favor of this being the fact, but it is so important that we must detail it here. In an insane patient, who died on the fourth day after menstruation, Benham² found a large corpus luteum with a highly vascular yellow zone, and some decolorized fibrine in its interior. In the uterus a small unimpregnated ovum was found embedded in the decidua. Cohabitation could not possibly have occurred, as the patient, being insane, had been under observation. If we wished to generalize from this observation, we should find in every menstruation the birth of an unimpregnated ovum, with exfoliation of the mucous membrane of

¹ Archiv f. Gyn., Vol. III., p. 457.

² Edinb. Med. Jour., Aug., 1873, p. 127.

the uterus. (Under abnormal conditions the mucous membrane may be cast off during menstruation in great shreds, adhering to one another, constituting membranous dysmenorrhœa.)

From the fact that the hyperæmia of pregnancy, which is decidedly more marked than that of menstruation, does not lead to hemorrhage, we may conclude that the fulness of the blood-vessels at the menstrual period does not determine the sanguineous secretion.

These views, as above stated, are not yet well established, yet they have something unusually plausible about them. The actual menstruation, that is, the discharge of blood from the uterus, would in this view, it is true, occupy a totally different position, as it would no longer be estimated as the indication of the greatest afflux of blood to the genital organs, but would have to be regarded as a retrogressive stage of the menstrual epoch.

Of course it has been known before that this sanguineous discharge is not the peculiar essential event of the periodic congestion. A whole series of facts proves that ovulation and a sanguineous discharge from the uterine mucous membrane may exceptionally occur independently of one another; and *à priori* there are no reasons to lead us to infer the contrary.

We certainly should not be willing to draw from these facts the conclusion that Beigel¹ does, viz., that ovulation and menstruation are completely independent of one another, and that the discharge of the ovum may take place at any time whatever, even in children, but that menstruation is nothing but the periodically returning demand of the female genital organs for sexual gratification.

It is clear that the two phenomena have no necessary and absolute connection, and that the occurrence of one without the other is quite conceivable.

It is exceedingly easy to comprehend that with some monthly congestions the discharge of an ovum may not take place, for the simple reason that no follicle is sufficiently ripe for the hyperæmia to cause its rupture. We cannot, therefore, prove that the two have no connection at all, from the cases in which,

¹ Krankh. d. weibl. Geschlechts, Vol. I. Erlangen, 1874, pp. 305 et seq.

at the autopsies of menstruating women, we find no freshly ruptured follicle.

There is just as little difficulty in imagining that cases may occur in which, as an exception, the laceration of the vessels of the mucous membrane does not happen, although there has been the congestion of the genital organs and the discharge of the ovum ; hence cases of conception without menstrual hemorrhage present nothing inexplicable.

Again, the circumstance that women may apparently conceive at any or almost any time will not dispose of the view that the discharge of the ovum takes place at any time, and quite independently of menstruation, for we know next to nothing about the time required for the ovum to reach the uterus, or how long it may remain in the uterus capable of impregnation ; and we are equally ignorant about the length of time that the spermatozoa retain their vitality in the female genital organs. According to Kundrat's views it would be difficult to explain conception immediately before or during the period, as it would be a time when no ovum capable of impregnation is present, and when the uterine mucous membrane is being cast off.

If we are obliged to reject the complete independence of ovulation and menstruation, we will still emphatically remark that it will be difficult to controvert the possibility of ovulation independently of the periodic congestion. A ripe follicle also may doubtless occasionally burst, quite independently of this cause, *e.g.*, from an injury produced by a blow on the abdomen.

A much more weighty objection to the connection of menstruation with any processes whatever in the ovary is the amply well established fact that menstruation may continue after double ovariectomy. The cases of unilateral ovariectomy, with advanced degeneration of the other ovary, of course prove nothing, especially when conception also occurs, since then ovulation must certainly have taken place. We say expressly may continue, for it is certain that ordinarily it does not do so. We prefer in such exceptional cases, instead of drawing the conclusion which is directly opposed to all our views, *viz.*, that menstruation has absolutely nothing to do with the presence of ovaries,

to assume that in these women, too, menstruation was caused by the growth of Graafian follicles in their ovaries, but that the organism had in the course of years become so accustomed to the regular discharge of blood that this still continued, although the ovaries were removed. Yet we do not know at present whether something similar to this is not regularly the case in the great majority of women, that is, whether ovulation does not, as a rule, cease sooner than menstruation. This idea is favored by the frequent continuance of the latter up to the fiftieth year, while fertility ceased much earlier.

As a consequence, then, of what has been said, we do not at all consider menstruation as the peculiar essential event of the periodical congestion of the genital organs. The essential thing is the discharge of the ovum; the escape of blood from the mucous membrane is an accessory occurrence, which is, perhaps, only the indication of the retrograde metamorphosis of that membrane.

Nevertheless, the occurrence of the first menstruation is to be viewed as the external sign of commencing puberty, *i.e.*, as the sign that the Graafian follicles are beginning to grow vigorously, and are at least almost far enough developed to be capable of rupturing; as soon as they are ripe, conception also may take place, if the spermatic fluid is deposited in the vagina.

In this country [Germany] menstruation generally begins in the fifteenth year, and ceases at the forty-fifth or somewhat later.

According to the statements of Louis Mayer and Krieger, the periods begin in the fifteenth year in the largest number of girls, but still only in 1,240 out of 6,550, *i.e.*, in 18.9 per cent. Their occurrence in the fourteenth year is almost equally frequent, but in the sixteenth somewhat more rare. In the thirteenth year it is about half as frequent as in the fifteenth; in the twelfth very rare. From the seventeenth year onward the setting in of menstruation becomes gradually more infrequent.

A number of circumstances influence the *time of occurrence* of the first menstruation, and it is only by sufficiently large and therefore trustworthy figures, that these can be in part ascertained.

Climate is of the greatest significance, and the variations in

the average commencement of the courses in particular countries is far more dependent upon it than upon peculiarities of race, and the fact is, that, generally speaking, menstruation begins earlier the hotter the climate is. While among the negroes of Africa and among the East Indians menstruation sets in at the tenth or twelfth year, among the Swedes and Norwegians it appears only at the fifteenth or sixteenth, and among the Swedish Laplanders only at the eighteenth.

The next thing to be considered is the *mode of life*, the fact being that among those in the middle walks of life, who lead a more luxurious existence, menstruation occurs earlier than among those classes who grow up in the midst of hard work and partly in want and privations of every kind. According to Krieger the average for the higher ranks is 14.69 years; for the lower, 16.

Upon this depends the fact that in cities the periods are established earlier than in the country, for among opulent persons living in the country they occur very early.

We should be inclined to ascribe to early marriage a marked influence upon the early occurrence of the menses. Among the Hindoos, however, girls are obliged to marry before the establishment of the menses, because every menstruation occurring in a girl who has not the opportunity to conceive is regarded as infanticide, and yet it appears that its occurrence is not earlier (being at the twelfth year) than we might anticipate from the climate.

With regard to the conditions under which among ourselves menstruation occurs early or late, Louis Mayer has furnished us with very elaborate statements, from which it appears that brunettes menstruate earlier than blondes,¹ and weakly girls rather earlier than strong ones, especially in the higher ranks. Krieger gives detailed statistics, in which the stature is also taken into consideration, and from which the interesting conclusion is drawn that in the higher ranks the small and weakly come to maturity earlier, while in the lower ranks the opposite is the case.

¹ According to *Marcuse* (Ueber den Eintritt der Menstr. Diss. Inaug. Berlin, 1869), the contrary is the case.

Menstruation continues¹ for some thirty years, or rather longer, in temperate climates, while in the North it appears to be somewhat shortened. In hot countries, however, its duration diminishes so greatly that the Arabian women reach the menopause after only twenty years.

Women in whom menstruation was established early do not generally, on that account, reach the menopause early. On the contrary, the duration of menstruation is calculated, from Mayer's tables, for those menstruating early, at 33.673 years, for those menstruating late, at 27.344. Taken altogether, the menopause may be looked for at about the forty-fifth year. According to the results obtained by Cohnstein² from 100 cases, the greatest duration of menstruation is found in women who menstruate early, marry, bear more than three children, nurse their own children, and continue to have their confinements at full term, at the age of from thirty-eight to forty-two.

While the beginning of menstruation is in many cases accompanied by disturbances, such as nervous phenomena, and disturbances of nutrition, the same is also the case with the menopause (change of life, *l'age critique*). It sometimes happens that at about the forty-fifth year the periods, without any other symptoms, are very scanty for a few times and then do not return again. Very commonly the critical period extends through months or even years. In these cases the monthly discharge of blood may continue regular in point of time, but may gradually diminish in quantity, or the intermenstrual periods may be prolonged so that the periods return, perhaps, every six weeks, every two or three months, etc. Sometimes there remains a leucorrhœa, lasting for a good while, or returning at regular intervals. There may also be attacks of nervous depression, meteorism, rectal hemorrhages, diarrhœa, pains in the abdomen, profuse sweats, and other phenomena.

It is difficult to collect large figures for the determination of the average period of life for the menopause, first, because the climacteric age often comes on gradually, and secondly, because

¹ *Tilt*, *The Change of Life*, 3d ed. London, 1870; and *Kisch*, *Das klimakterische Alter der Frauen*. Erlangen, 1874.

² *Deutsche Klin.*, 1873, No. 5.

women regard every hemorrhage from the genital organs as menstruation, whereas hemorrhages from other sources are not unusual, even at later periods. According to Mayer, the menopause occurs later in the higher walks of life, on an average at 47.138 years, so that among them the periods, beginning earlier and ceasing later, last considerably longer.

It appears that actual menstruation sometimes occurs even during childhood, and quite apart from pathological hemorrhages, which may take place from the vagina in rare cases, especially in children affected with acute diseases. Such children are, as a rule, in advance of their age in their whole corporeal development, and many such cases are to be regarded only as an interesting exception to the rule. If the opportunity is offered, conception may even occur under such circumstances, as proved by a series of instances to be found in the most recent literature. Kussmaul¹ reports that Anna Mummenthaler, when eight years old, became pregnant by her uncle, and was delivered after nine months; according to Rowlet,² Sally Deweese menstruated at the age of one year, and was confined when ten years old; according to Macnamara,³ a Hindoo girl was confined at the age of ten years and a half; according to Cortis,⁴ Elizabeth Drayton became pregnant twenty-four days before her tenth birthday, and was delivered of a mature male child at the age of ten years, eight months, and seven days; Fox,⁵ of Philadelphia, delivered a girl of eleven years and three months; Willard⁶ witnessed a confinement occurring at eleven years, eleven months, and twenty-four days; Horwitz⁷ adduces a series of cases of precocious menstruation and confinement, particularly from the older literature, and he himself witnessed the normal delivery of a girl scarcely twelve years old. Above this age the cases are more numerous. Ketchum⁸ relates one of the most interesting; it concerned a negress who became a grandmother at twenty-five years and nine months, having borne a child herself at thirteen years, and her daughter having become pregnant at twelve years. Precocious menstruation, moreover, is sometimes the symptom of disease, especially of new growths in the ovary (Kussmaul).

In the same way cases also occur where the periods last unusually long, up to the fiftieth year, or even longer, although the majority of such instances most certainly refer to cases confounded with pathological hemorrhages. Two cases

¹ Von dem Mangel, etc., p. 42.

² Amer. J. of Med. Sci., Nov., 1834, p. 266.

³ Lancet, Dec. 13, 1873.

⁴ Med. Times, April, 1863.

⁵ Harris, Amer. J. of Obstet., III., p. 616.

⁶ E. 1., p. 638.

⁷ Petersb. Med. Z., Vol. XIII., p. 221.

⁸ Harris, loc. cit., p. 572.

adduced by Scanzoni¹ should admonish us to exercise the greatest prudence in this respect. At the autopsy of a woman of sixty-one years, who had had hemorrhages recurring at quite regular intervals, the ovaries were found completely atrophied, while there were two mucous polypi in the cervix; and in a woman of sixty-four years, who had not menstruated from her forty-eighth to her fifty-second year, and from then till the time of her death had had hemorrhages at intervals of three or four weeks, the ovaries were likewise found atrophied, and the hemorrhages were evidently due to disturbances in the circulation, resulting from a feeble heart. It is proved, however, by a series of cases of confinement in very old women, although it is difficult to believe all of them, that, as a matter of fact, ovulation, and consequently the possibility of conception, may, in exceptional cases, continue for a very long time.²

Little is yet positively known about the *anatomical changes* which accompany the monthly congestion.

In the ovaries the tumefaction, as a rule, although not invariably, results in the rupture of a Graafian follicle, the contents of which then escape into the abdominal cavity. Sometimes no effusion of blood whatever seems to take place; at all events it is, as a rule, so insignificant that only a small extravasation accumulates in the interior of the follicle.

The expelled ovum is usually drawn by the ciliary motion of the epithelium of the tube into the ostium abdominale, and the ruptured Graafian follicle is converted into the corpus luteum, or rather, if conception has occurred, under the influence of the powerful determination of blood to the generative organs caused by pregnancy, it is converted into the true yellow body, while in the other case the process of granulation is much more sluggish and imperfect, and only a smaller, so-called false yellow body is formed.

The tubes also share in the general hyperæmia, yet it does not amount to such an erection of the fimbriæ that they grasp the ovary, though they certainly become somewhat more rigid, nor is there a discharge of blood, although there is swelling of the mucous membrane of the tube.

Kundrat and Engelmann³ have recently made important statements about *the condition of the uterine mucous membrane*.

¹ Krankh. d. weibl. Sexualorg., IV. ed., Vol. I., p. 358.

² Kisch, Das klimakterische Alter, etc., p. 44.

³ Stricker's medic. Jahrb., 1873, 2d Part, p. 139.

“The mucous membrane is swollen, from three to six mm. thick, relaxed, softened almost to deliquescence, puffy, covered with a turbid, whitish, or often bloody mucus, finely injected at certain points, in many cases quite decidedly reddened.” The swelling is due to the increase in size and number, in the uppermost layers, of the round cells composing the substratum of the mucous membrane. Although the glands themselves have become longer and wider, their open orifices, in consequence of this swelling, appear contracted into a funnel shape. According to the statements of the two authors, these changes take place some time before the sanguineous secretion. At the time of the menstrual hemorrhage, the proliferated cells of the uppermost layers are found noticeably turbid, and studded with fat granules; as extravasations of blood are never seen in the mucous membrane, they believe that the hemorrhage is caused by the superficial layers of the mucous membrane being cast off after undergoing fatty degeneration.

The blood mixes with the mucus of the uterine cavity, and with the superficial epithelial layers that have been exfoliated; it makes its way through the cervix into the vagina, and flows out.

During menstruation *the uterine parenchyma* becomes richer in blood, so that the walls are thicker and more tense, and thus a flexed uterus is somewhat straightened out during the periods.

The mucous membrane of the vagina likewise gives evidence of hyperæmia and increased secretion, and the breasts, too, are apt to be swollen, and sometimes become painful.

The secretion eliminated during menstruation consists principally of blood, which differs in no essential respect whatever from that derived from other hemorrhages. With the blood are mixed the secretion of the cavity of the uterus, and that of the cervix and vagina, and in these secretions are also abundant epithelial cells that have been thrown off. The fact that the menstrual blood does not usually coagulate is not due to the absence of fibrine, but to the admixture of the acid vaginal secretion. The secretions of the genital canal, which are mixed with the menstrual blood, also give it the characteristic smell, which is ordinarily scarcely perceptible, but in some cases very marked.

The type of menstruation varies greatly. It has nothing to do with the phases of the moon, and its periodical return after exactly twenty-eight days is at any rate not especially frequent.

Such a degree of regularity in the occurrence of the menses that women can determine in advance the day, or even the hour of their return, we must in general regard as an exception, though perhaps not a very rare one. The statements of women regarding the type of their menstruation are generally extremely untrustworthy, so that even educated women, who are observant of themselves, have very often no accurate knowledge of the matter. The fact is, they are inclined to assume its regular character in their own case, because they were previously of opinion that it must be so; but if more closely questioned they know nothing precise about it, or are obliged to admit its irregularity. Although we consider the return of the menses after about twenty-eight, *i.e.* from twenty-seven to thirty days, as customary, we must still declare that, as a rule, according to our experience, the periods return in any one healthy woman sometimes after twenty-seven days, sometimes after twenty-eight, twenty-nine, or thirty, and even with more marked differences, especially on their reappearance after the puerperal state. The opposite statements are based principally on this, that authors setting out with preconceived opinions, which are those generally received among women, have, without further inquiry, assumed the recurrence of the periods every four weeks as founded on fact. Yet Krieger frankly declares, in his painstaking work, that because menstruation is a crisis, and all crises occur at periods of seven days, or are divisible by seven, so every menstruation is pathological which does not adhere to the twenty-eight day type.

Just as little definite information do we possess about the *duration* of the menstrual flow. It lasts, as a rule, more than three days, four, five, and apparently very often eight days. A hemorrhage lasting two days, or only one day, is rare, and often the symptom of some uterine disease. Here, too, we must combat the idea of regularity, as the periods in one and the same healthy woman sometimes run for three, sometimes for four or five days. It is much more difficult to determine the fact in this

case because, although it is easy to fix the date of the beginning of the period from the first appearance of the reddish color, the ending will be very variously estimated, because the blood disappears slowly while the secretion still continues, and there are frequent returns of traces of blood in it.

It is still more difficult to determine the *amount* of the menstrual blood. Here we are generally referred to conjectures which are altogether uncertain. Sims estimates it by the number of cloths used. In general the quantity is small when its duration is short, abundant when it lasts longer.

In the arctic regions it is said that the amount is exceedingly small, in fact, that the Esquimaux women menstruate during the summer months only, and then to an insignificant amount; in the tropics, on the other hand, menstruation is said to be very profuse. In our climate it is reckoned, by various authors, at from about three and a half to nine ounces.

The *effects of menstruation upon the system at large* have also as yet received very little exact study; in fact, the statements about it are not seldom directly contradictory.

In opposition to the older statements, Rabuteau¹ declares that the temperature, as measured in the vagina, shows an average depression of about 1° F., and that the frequency of the pulse is also less. The excretion of urea is also diminished. Hennig² was able to confirm the fall of the pulse, but not that of the temperature.

Menstruation, even when running a perfectly normal course, has a disturbing influence upon the general condition. The women are slightly irritable. Disturbances of the circulatory apparatus and of the digestive organs, and particularly of the nervous system, are quite commonly developed; also slight dragging pains in the back and loins may be present, without pathological changes in the uterus. It may be regarded as highly characteristic that the women themselves say "they are unwell."

All such symptoms can only be considered as physiological

¹ Gaz. de Paris, 1870, p. 646; 1871, p. 22.

² Arch. f. Gyn., II., p. 300, and IV., p. 371.

as long as they are present to only a slight degree, and do not lead to more serious disturbances of the system at large. In many persons, however, they lead to the most serious disturbances in bodily and mental condition, the more minute description of which here would lead us too far. (See Krieger, loc. cit., p. 99.)

AMENORRHOEA. '.

We regard as amenorrhœa only those cases in which no hemorrhage at all proceeds from the uterine mucous membrane, while we do not count as belonging in this category those cases in which the blood is discharged into the cavity of the uterus, from which, however, owing to occlusion of the genital canal, it cannot flow out—cases, in reality, of hæmatometra.

Amenorrhœa may be either persistent or temporary.

In its *persistent form* it occurs in many instances of want of development of the uterus and ovaries, especially in absence and imperfect development of the uterus. Apart from these cases, it is very rare for amenorrhœa to last all through life; although cases do occur in which menstruation has never shown itself, and yet the sexual life of the woman has been in no way altered. Still, in such cases menstruation may appear very late. Thus, Loewy¹ saw a case where menstruation had been completely absent until the thirty-first year, when after the sixth confinement it first occurred.

Much more frequently there is a *temporary amenorrhœa*, such as we have already become familiar with, where the establishment of menstruation has been delayed or its cessation has been premature. It is a physiological condition during pregnancy and lactation. In the former condition there are almost absolutely no exceptions, while in the latter they are quite numerous.²

We cannot here enter more particularly into the consideration of those forms of amenorrhœa which are of purely symptomatic origin in certain affections of the uterus and ovaries. These we

¹ Wien. med. Wochenschr., 1868, No. 89.

² Louis Mayer, Berl. Beitr. z. Geb. u. Gyn., II., p. 124.

have already spoken of in part, and in part shall treat of hereafter.

Aside from these, a temporary amenorrhœa occurs most often in connection with lesions of nutrition and debilitating diseases of the general system; very frequently soon after puberty in chlorotic girls; in tuberculosis, and in acute wasting diseases, especially typhoid. We must also here include the amenorrhœa which accompanies excessive corpulence.

It is an interesting fact that psychical influences may cause amenorrhœa, although much less frequently than is commonly supposed. Thus it has been observed that the menstrual flow suddenly ceases after a great fright, some sad piece of news, and especially after sudden mental excitements. [See Parvin on the Influence of the Mind over Menstruation.] Raciborski² has called attention to the “amenorrhée par causes psychiques,” which may occur when girls or women under certain circumstances have reason to stand in the utmost dread of pregnancy. While they are waiting with anxiety for the usual time of the menstrual hemorrhage, it actually fails to show itself in consequence of this mental change; and the doubt which it causes vanishes, and the period sets in only when the conviction is established that there is no pregnancy. Bohata³ adds another case to the two mentioned by Raciborski. On the other hand, it seems possible for the period to be delayed or to fail in women who eagerly desire the occurrence of pregnancy, and who look for the appearance of the menses with great mental agitation from fear of being sterile.

In concluding the subject of amenorrhœa we would briefly call attention to the cases of so-called *vicarious menstruation*, that is, those where the menses are absent or scanty, and periodical hemorrhages take place from other parts of the body, such as the mucous membrane of the nose, the lungs, the stomach, from hemorrhoids, ulcers, or wounds.

As periodical hemorrhages from ulcers, etc., also occur in men, we must be very careful about our interpretation of such

¹ American Practitioner, Sept., 1872, and Boston Gyn. J., VII., p. 208.

² Arch. gén., May, 1865, and loc. cit., p. 576.

³ Wien. med. Presse, 1866, No. 31.

facts; but still there can be no doubt that cases actually happen in which such hemorrhages take the place of menstruation.

As to therapeutics, we must express ourselves as in general opposed to all so-called emmenagogues in amenorrhœa. The hemorrhage from the uterine mucous membrane is only a process which accompanies ovulation, and which is not in itself necessary. If there is no ovulation, it is unreasonable to try to bring on the hemorrhage, while, if ovulation goes on regularly without hemorrhage, it is no disadvantage.

Temporary amenorrhœa is ordinarily, if we except manifest disorders of the genital apparatus, of which it is a symptom, a sign of disturbances in the nutrition of the body, which either prevent the growth of the Graafian follicle, or at least so moderate the periodical hyperæmia of the genital organs that no uterine hemorrhage takes place. We must therefore endeavor to improve the nutrition and strengthen the whole organism by good food, including meat, beer, and wine, and by an invigorating mode of life, embracing time spent in the open air, moderate bodily labor, cold washing and rubbing of the whole body, and baths in fresh and salt water. In chlorotic girls iron is the only efficient emmenagogue.

If the amenorrhœa depend upon deficient nutrition and blood-supply of the genital organs, whether congenital or developed during the procreative period of life, we must try to promote an increased access of blood to them by the use of proper emmenagogues; not so much, however, by internal remedies such as aloes, savine, or saffron, as by stimulating foot-baths, warm sitz-baths, the cold or warm douche, leeches, the sound, intra-uterine pessaries, and the like. In some cases the use of electricity in its various forms seems capable of producing favorable results.¹

We may go further in the use of emmenagogues in cases where the periods are absent, and in which, without our being able to prove the existence of a local disease, disturbances are still met with which are apparently connected with the genital system.

¹ *Rockwell*, Amer. J. of Obst., V., p. 26, and *Baker*, Boston Med. and Surg. Journal, Aug. 29, 1872.

MENORRHAGIA.

By menorrhagia is understood excessive menstrual hemorrhage, in distinction from metrorrhagia, by which is meant any flow of blood from the uterus.

Since there are marked individual variations in normal menstruation, we ought only to speak of a menorrhagia when the loss of blood has an injurious effect upon the general system. In such cases menorrhagias are almost always connected with appreciable changes in the uterus. We cannot here enter more fully into these cases.

Menorrhagia but rarely depends upon general causes. It may happen in cases of hemorrhage, of scurvy, and in women who are badly nourished, as a result of debilitating influences, as, *e.g.*, in cases of prolonged lactation. In these cases, as also in case of excessive formation of fat, amenorrhœa sometimes sets in, and sometimes menorrhagia, or the profuse hemorrhages take place only after the former condition has preceded them.

The treatment is of course to be directed against the causes, especially against any diseases of the uterus that may be present. If the menstrual congestion sets in with violent symptoms, and there is then a great flow of blood, it is best to take some blood by scarification shortly before the period.

In those who are corpulent, Dancel¹ recommends a judicious diet, such as animal food or the Banting system, and once or twice a week a purge of scammony. Among the watering-places Marienbad is most useful to these patients.²

We may use various kinds of symptomatic treatment if we do not succeed in discovering or removing the cause of the trouble. It is not at all easy to use cold, as it ought to act continuously, and bladders of ice placed upon the belly are of but little service. Cold injections into the vagina are much more efficacious; but they must be continued for a long time, as the temporary application of cold results in the opposite of the effect intended, *viz.*, a more active congestion, and not infre-

¹ *Gaz. des hôpit.*, 1866, Nos. 73 and 76.

² *Kisch*, *Berl. klin. Wochenschr.*, 1867, No. 20, and *Wien. med. Presse*, 1870, Nos. 15-20.

quently even inflammation. Cold is best applied by means of a continuous stream of water conveyed into the vagina, as can easily be accomplished by means of the irrigator. Hamon¹ uses from five to eight gallons three times a day. Kisch² has contrived a vaginal irrigator, which consists of a receptacle supplied with two tubes, which is placed in the vagina, and through which a stream of cold water can be led continuously, so that the vagina is not made wet but only cold.

We have referred to the mode of using ergot and ergotine when speaking of uterine fibroids.

DYSMENORRHOEA.

Besides the literature already cited when speaking of stenosis of the uterus, and that which follows under the head of membranous dysmenorrhœa, see *Huartmann*, Petersburg med. Z., 1862, p. 129.—*Greenhalgh*, London Obst. Trans., V., p. 164.—*Holst*, Beitr. z. Geb. u. Gyn., 2 H. Tübingen, 1867, p. 1.—*Barnes*, London Obst. Trans., XIV., p. 108.—*Duncan*, Edinb. Med. Journ., May, 1872, p. 961.

We must in the first place get a clear conception of dysmenorrhœa.

Even in perfectly healthy women the state of health is somewhat altered during menstruation. Apart from a greater irritability and increased nervousness, certain local difficulties also occur, such as a sense of weight and fulness in the pelvis, slight dragging in the back, a more frequent inclination to pass water, etc.

These symptoms are undoubtedly due to the enlargement which the uterus undergoes during the period. They may be aggravated if either the menstrual congestion is unusually active, or if the uterus is in any other way diseased. When there are neoplasms of the uterus, and, above all, when there are inflammations, the difficulties mentioned increase; in fact, when there is perimetritis there may be the most severe pains in the bowels. We ought not by any means to include under the head of dysmenorrhœa those pains accompanying the period, and which are commonly designated as congestive dysmenorrhœa,

¹ Schmidt's Jahrb., 1870, 4.

² Wien. med. W., 1870, No. 32.

for in these cases the regular symptoms of uterine diseases are only intensified by the menstrual congestion.

We must, of course, pass over ovarian dysmenorrhœa for the same reasons. The ovaries also enlarge during the period, and may consequently give rise to pain, especially if they are pressed upon, as when they lie in a hernial sac or deep in Douglas's space, or if they are already inflamed. But these pains even have nothing about them characteristic of menstruation as such, but are only the consequence of an enlargement of the ovary when abnormally situated or when inflamed; even the rupture of the Graafian follicle, when accompanied by an exceptionally large hemorrhage, may cause severe pains. Such pains, however, are always primarily the result of an irritation of the peritoneum, are therefore peritoneal in their nature, and must not be called dysmenorrhœal. In this respect ovulation has an etiological significance in connection with perimetritis, but not with dysmenorrhœa.

The pains of dysmenorrhœa proper have a very marked character of their own. They occur as colicky pains, resembling those of labor, and are hence called uterine colic. They begin in the back, and extend to the sides and thighs, and either take place periodically, or at least their severity is intensified at short intervals. These attacks of uterine colic have nothing to do with inflammatory pains, except as they are sometimes complicated with inflammations. The temperature is not raised, and the pains, which may be so intense that the women believe they will go mad, disappear, without leaving a trace behind, when once the cause is removed.

In exceptional instances this cause depends upon the presence in the cavity of the uterus of foreign bodies, which induce contractions of its muscular elements, thus calling forth more or less pain. Such a foreign body, apart from neoplasms, may consist of fluid blood, coagula, or parts of the mucous membrane which have been cast off. If this is cast off in shreds of considerable size, it amounts to a special well-marked form—membranous dysmenorrhœa—which we shall soon consider by itself.

These substances may be retained, either when they are so bulky that they cannot pass through the normal cervix, or

when the cervical canal is abnormally narrow. This latter condition may be due to congenital or acquired constrictions, or to tumors and flexions, rarely to spasm of the os internum.

It is generally impossible to determine how great the constriction must be to lead to retention of the contents of the uterus. While coagula or shreds of mucous membrane may be unable to make their way without trouble, even through quite a wide cervix, fluid blood can generally flow off, even through one which is very narrow, provided, however, that the blood is discharged slowly from the mucous membrane. If the menstrual hemorrhage takes place very rapidly, it may happen that the great quantity of blood discharged flows off but imperfectly, even through a cervix which is not abnormally narrow, thus leading to distention of the cavity by the blood, and consequently to dysmenorrhœa.

The pains of dysmenorrhœa usually appear before the blood, for the very reason that its passage is prevented by thickening of the mucous membrane of the cervix, by flexions at the os internum, or by a uterine tumor. So soon, however as the contractions of the uterus have forced a way through, the blood flows off freely, and the pains which have been so grievous quickly subside.

The diagnosis of dysmenorrhœa, if we only understand by this term the pains caused by contractions of the uterus, is easily established by the characteristic pain. It may, however, be very difficult to discover the efficient cause in individual cases. With regard to this, we must refer to the special chapters on diseases of the uterus.

We can here enter but little into the treatment, which must be judiciously aimed at the causes of the difficulty. It is necessary to treat dysmenorrhœa symptomatically only when the mechanical obstacle cannot be recognized or removed. In this case we employ narcotics in the usual ways. The English attribute special efficacy to Indian hemp in dysmenorrhœa. Silver¹ uses twenty-minim doses of the tincture. Mohun Sircar²

¹ Med. Times, July 16, 1870.

² Indian Med. Gaz., April 1, 1873. (See Amer. Journ. of Med. Sci., July, 1873, p. 276.)

recommends the white viscid fluid obtained from the thick fleshy bark of the root of *Abroma agustum* (Olutkombol).

DYSMENORRHOEA MEMBRANACEA.—DECIDUA MENSTRUALIS.

Morgagni, De sed. et caus. morb. II. Venet., 1762, Ep. 48, p. 229.—*Duncan*, Med. Facts and Observ., Vol. I., p. 103.—*Oldham*, London Med. Gaz., July to Dec., 1846, No. 38.—*Simpson*, Edinb. Med. Journ., Sept., 1846, p. 161, and Select. Obst. Works, I., p. 672.—*Scanzoni*, Die chronische Metritis. Vienna, 1863, p. 120.—*Klob*, Pathol. Anat. d. weibl. Sex. Vienna, 1864, p. 217.—*Mandl*, Wiener med. Presse, 1869, No. 1, etc.—*Saviotti*, Scanzoni's Beitr., VI., p. 219. *Solowieff*, Arch. f. Gyn., II., p. 66.—*Hegar* and *Muier*, Virchow's Archiv, 1871, Vol. 52, p. 161.—*Hausmann*, Berl. B. z. Geb. u. Gyn., Vol. I., Part 2, p. 156.—*Huchard* et *Labadie-Lagrave*, Archives gén., 1870, Vol. I., 678, II., p. 69 and 1871, Vol. II., p. 706.

Etiology.

The investigations of Kundrat and Engelmann¹ have thrown new light upon what we know of membranous dysmenorrhœa, *i.e.*, the menstrual discharge of the superficial part of the uterine mucous membrane in a more or less coherent form. According to them, the glands of the uterus become increased in length and width during the period, and the subjacent tissue swollen from proliferation of round cells. These processes do not, however, take place during the hemorrhage, but develop gradually before it. The hemorrhage is not, in fact, the expression of the greatest congestion, but is a process due to the fatty degeneration of the uppermost layers of the mucous membrane, and already retrogressive. In this view, the normal process of menstruation is the following, *viz.*, the upper layers of the proliferated mucous membrane are exfoliated, and thereby a hemorrhage is occasioned.

Membranous dysmenorrhœa is evidently only an enhancement of this process. Considerable layers undergo fatty degeneration and are then exfoliated, no longer in minute particles, but as shreds or as a coherent membrane.

¹ Stricker's med. Jahrb., 1873, p. 135.

In this case the pain is not at all characteristic, but is due to the same causes which occasion every other kind of dysmenorrhœa, only that now the cervix is not necessarily narrow, for the membranes cast off cannot usually pass through the normal cervix, except under the influence of uterine contractions.

The cause of the increased thickening or of the extensive destruction of the mucous membrane depends of course upon various processes. Sometimes we have to do simply with an increased development of the mucous membrane, in other cases it is chargeable to chronic diseases of the uterus, especially metritis and endometritis, or particularly to any processes which otherwise occasion proliferation of the uterine mucous membrane. The fact that membranous dysmenorrhœa has been observed in poisoning by phosphorus favors the view that a profound fatty degeneration, even in a normal mucous membrane, may bring about the membranous exfoliation.

Pathological Anatomy.

The superficial layer of the uterine mucous membrane is thrown off sometimes in shreds resembling pieces of skin, but often in such a coherent shape as to exhibit the three-cornered form of the uterus, and to include a distinct canal. Even the orifices of the two tubes and the opening of the os internum may be distinguishable. The thickness of the membrane is various and unequal, even in the same preparation.

The internal surface, or that which is turned towards the cavity of the uterus, is smooth, irregularly subdivided by furrows, and perforated like a sieve, by the openings of the glands of the uterus. The external surface, where the separation took place, is bloody, rough, shreddy or villous, often the more so from fibrinous deposits.

Under the microscope, the membranes are found to consist of the connective tissue of the mucous membrane penetrated by the glands, and of a very abundant new formation of connective tissue, comprising large round cells, the so-called decidua cells.

Symptoms.

The period takes place at the customary time, in exceptional cases somewhat earlier than usual, rarely somewhat later, and the membrane is cast off on the second, third, or more rarely only on the fourth day. At the beginning of the complaint, especially if there are no complications of other kinds, the expulsion of the membrane often goes on without severe pain, but in other cases there are attacks of uterine colic; in fact, the most violent paroxysms of pain may occur, particularly if the process is prolonged, and there are several separate pieces. During its expulsion, the membrane, by plugging the cervix, may lead to an arrest of the discharge of blood.

The time between two periods is free from pain.

There are very commonly complications, most frequent among which is chronic catarrh, which may, indeed, usually be regarded as a cause. Metritis also is quite frequent, having either been present before, or setting in as a consequence of the dysmenorrhœa.

Course and Results.

The discharge of the menstrual decidua on but a single occasion is so rare that its occurrence is contested by Hausmann; but I have observed one positive instance of it in a nursing, puerperal woman in whom the period returned again, but after a longer interval than before. In the majority of cases the disease continues through a series of menstrual periods, often for years; in fact it may continue up to the menopause. In such instances the symptoms, as a rule, grow constantly more severe, and menorrhagia is very apt to set in.

The ordinary result of membranous dysmenorrhœa is sterility, though some cases have been established in which conception took place during the continuance of the affection. The disease returned, however, after the puerperal period.

Diagnosis.

The menstrual decidua can be positively distinguished from a simple fibrinous coagulum, to which it has a superficial resem-

blance, by careful examination even of its gross appearances, but more easily by the microscope.

The differential diagnosis from an early abortion may be more difficult. This latter is determined, if we succeed, by thorough investigation, in verifying the villi of the chorion. If these cannot be found, it may still happen that we have to do with an early blighted ovum; but it is not justifiable to explain by abortion all cases in which a membrane is only once discharged, even if the customary time for the period has passed by without any hemorrhage, for the period is also delayed sometimes when there is a menstrual decidua.

Prognosis.

Although the disease does not endanger life, the prognosis is unfavorable so far as this, that recovery does not occur before the climacteric period, when the trouble has already lasted for a considerable time. At the menopause it disappears and leaves no traces.

Treatment.

A cure cannot be attained either by internal remedies or by local blood-letting.

Intra-uterine injections of nitrate of silver, tannin, chloride of iron, tincture of iodine, or carbolic acid are the most efficacious, and they should be made soon after the period. Noticeable improvement is usually effected in this way, the membrane becoming thinner, but the decidua seldom disappears entirely, or if this does happen there is a relapse.

The pain is to be treated symptomatically, in the ordinary way, by narcotics or by emollient fomentations, but the diminution of the pain is most surely attained by artificial dilatation of the cervix. We described under the head of Stenosis of the Cervix the exact way of doing this.

We must lay special importance upon the treatment of the complications, because in this way the difficulty can be sensibly relieved.

DISEASES OF THE FALLOPIAN TUBES.

ANOMALIES OF FORMATION.

Under the head of Malformations of the Uterus we have already referred to the most important congenital anomalies of the tubes, so that here we shall only treat of the

DEFORMITIES OF THE MOUTHS OF THE TUBES.

W. Merkel, Beitr. z. pathol. Entwickl. d. weibl. Genitalien. Diss. Inaug. Erlangen, 1856.—*Rokitansky*, Allg. Wiener med. Zeit., 1859, No. 32, and Wiener Woch., 1860, Nos. 2-4.—*Klob*, Pathol. Anat. d. weibl. Sex., p. 276.—*Waldeyer*, Eierstock und Ei. Leipzig, 1870, p. 127.

In exceptional cases we find several openings in one tube, these being always situated in the neighborhood of the ostium abdominale proper. Sometimes we meet with simple slits without fimbriæ, which have come by a sort of dehiscence from hernial protrusions.

In other cases, however, there is such an excessive formation that we find in one tube two well-marked orifices supplied with distinct fringes. The tube is then apt to make a sharp bend in passing from the mouth nearest to the uterus to the terminal mouth (see Fig. 107).

These multiform ostia abdominalia are, according to *Waldeyer*, to be explained embryologically as follows: Müller's canal is formed by a folding in of the germinal epithelium, the fold running in the longitudinal axis of the embryo, that is, from the head to the pelvic extremity. This included part may consequently come into connection with the germinal epithelium again at some deeper spot, or at the time of formation of Müller's canal it may become only partially shut off, so that there may be a communication at several points with the abdominal cavity, or the tube may have a canal-like termination.

The so-called hydatid of Morgagni, a vesicle the size of a pea, which is connected with the tubes by a cord (at times quite long), and which is found, according to *Luschka*, in about one-

fifth of the cases, was formerly generally regarded as the blind end of Müller's canal itself, while the ostium abdominale was thought to have been formed by dehiscence in the continuity of the canal. According to Waldeyer, however, the hydatid is a partial prolongation of Müller's canal, the origin of which is as follows: A portion of it is attached high up at the ligamenta arcuata of the diaphragm to the Wolffian body, so that the connection of this part with the canal is drawn out into a long thread.



FIG 107.

Double ostium abdominale of the tube, after W. Merkel. From the first, *a*, the canal bends downwards to the second, *b*.

These abnormal orifices of the tubes have scarcely any practical importance, nor have they been proved to have any influence upon conception or the etiology of extra-uterine pregnancy.

CONSTRICTION AND CLOSURE OF THE TUBES, WITH THEIR RESULTS.—HYDROPS TUBARUM.—HYDROSALPINX.

Klob, Pathol. Anat. d. weibl. Sexualorgane, p. 288.—*Simpson*, Diseases of Women, p. 543.—*Hennig*, Der Katarrh der inneren weiblichen Geschlechtstheile, 2d ed.

Etiology.

We here make no further reference to the cases of congenital closure of the tubes which are commonly associated with divers

more important malformations of the genital canal. This change may be acquired in various ways.

Catarrh of the mucous membrane, for the most part, causes only narrowing, not closure. Ulcerative processes, too, with resulting cicatricial atresia, are very rare. Far more frequently the closure is due to cicatricial adhesion of the peritoneal surfaces of the fimbriæ at the ostium abdominale, caused by catarrh of the tubes which has extended to the fimbriæ, or to local peritonitis in the neighborhood of the mouths of the tubes. The process not unfrequently occurs on both sides. The adhesion takes place in such a way that the fimbriæ are bent back into the calibre of the tube, and become attached by their peritoneal surfaces. The secretion then collects in the tube, so that each separate fimbria is bulged out by the pressure of the fluid, and thus the end of the tube presents a very peculiar appearance, resembling a rosette (see Fig. 108, *O. a.*). In the middle is observed a funnel-

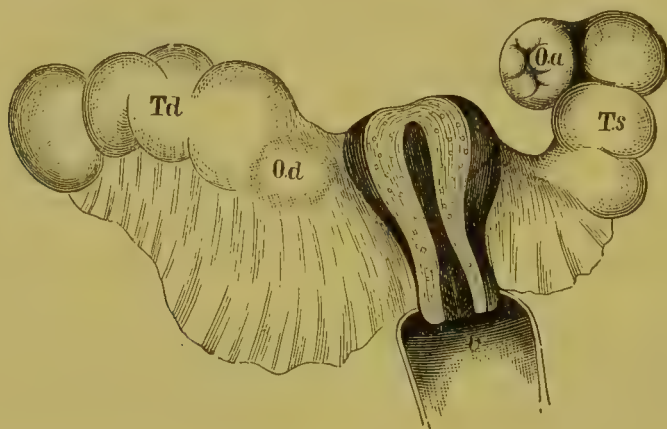


FIG. 108.

Hydrosalpinx of both sides.

v, vagina; *O. d.*, right ovary; *T. d.*, right tube; *T. s.*, left tube; *O. a.*, ostium abdominale of the latter, closed by the fimbriæ projecting inwards.

shaped depression, surrounded by several small distended prominences.

Most frequently the narrowing and closure of the tubes are caused by external force, their calibre being obliterated either by twisting and turning, or the tube being bent by adhesions and pseudo-membranes, resulting from peritonitis, and thus rendered impermeable. These occlusions may be found throughout the length of the tube, at one place or in many situations.

A constriction at the uterine orifice, from tumefaction of the mucous membrane, is not unusual. It is difficult, however, to determine how often a complete closure occurs here, for the uniform result of occlusion in other places, viz., the collection of the secretion in the tube, does not take place here.

Pathological Anatomy.

The changes at the seat of occlusion vary with its position and causation, and we have already briefly referred to them, so that here we have to speak only of the further consequences to which the occlusion leads.

Normally the tubes furnish but a very small amount of a perfectly indifferent secretion, which oozes from the ostium abdominale without causing irritation. As a usual thing, no secretion whatever seems to be discharged into the uterus from the ostium uterinum, as the closure of this opening never leads to accumulation of fluid.

This very small quantity of the natural secretion flows out without difficulty, even if the tube be narrowed, so that while the secretion is normal it is arrested only by complete atresia of the tube. If, however, the secretion becomes more abundant, stasis may occur even behind simply narrowed places; it may happen when there is a great deal of blennorrhœal secretion that the normal width of the canal is not sufficient to allow it to flow off, so that then even the normal tube may be distended.

In complete closure of the canal the secretion constantly accumulates in that part of the tube which lies between the seat of occlusion and the uterus, in fact the collection of fluid begins immediately behind the atresia. If, then, the ostium abdominale is occluded, the secretion first collects in the abdominal part, and the tube is gradually distended throughout the rest of its length. In this way the tube becomes thin, the muscular fibres are pressed asunder and disappear, the mucous membrane loses its folds, grows more like a serous membrane, and contains pavement epithelium. Thus the distended tube, being closely attached by its lower margin to the broad ligament, is thrown into convolutions, while the duplicatures of the mucous mem-

brane are retained at its sharp turns, and may give the appearance of septa.

This *hydrosalpinx*, or *dropsy of the tube*, may attain a very marked degree, although certain extravagant statements of the older authors are not worthy of credence. According to Klob, sacs the size of a child's head may be developed; and Peaslee¹ reports a case confirmed by autopsy where a dropsical tube, which had been twice punctured as an ovarian tumor, was found to contain eighteen pounds of fluid. As a rule, however, the hydrosalpinx is much smaller, and then has more the appearance of a sausage or portion of intestine. The tumor remains still smaller if the seat of the occlusion is not at the ostium abdominale, but in the continuity of the tube, as in such a case the secretion collects only on the uterine side.

The contents of the hydrosalpinx may be various. I have found a widely distended tube filled with a thick whitish substance, consisting of cast-off epithelium and mucus. As a rule, however, the contents consist of a clear, thin, yellowish, highly albuminous serum, often colored by the admixture of blood.

In cases in which the uterine opening is either normal or only constricted, but not closed, the accumulated fluid may flow off through the uterus, although there is no doubt that there may be hydrosalpinx even with a pervious uterine orifice. It is now plain, *à priori*, and is also established by a number of well-observed cases, that when a part of the fluid has once passed off through the uterine orifice the discharge is kept up by the abdominal pressure, and thus the whole sac is quite thoroughly emptied. This event, in which a considerable quantity of fluid is suddenly discharged from the tube through the uterus and vagina, was formerly described as *hydrops tubæ profluens*. There can be no doubt about the process, and if Kiwisch is surprised that the discharge always takes place through the uterus, and never into the abdominal cavity, this is very simply explained by the fact that when it is possible for it to discharge into the abdominal cavity no dropsy of the tube occurs. A case of Scanzoni's,² where in the cadaver he saw a distended sac on

¹ New York Med. J., 1870.

² Krankh. der weibl. Sexualorg., 4th ed., Vol. II., p. 75.

one tube and a collapsed, *i.e.*, an emptied, sac on the other, serves to confirm the opinion that the fluid discharged may actually come from the tube.

These evacuations are repeated from time to time, sometimes with a certain periodicity.

Symptoms.

Hydrosalpinx furnishes only indefinite symptoms resembling those of small ovarian tumors. A feeling of pressure or weight in the pelvis, or symptoms of pressure upon the nerves of the lower extremities, may be present; yet in many cases symptoms are wholly wanting, or there are only those indicative of the perimetritis which has caused or followed the affection.

Sterility, which is invariably present when the affection is double, is not apt to be absent even when it is single; for the tube which is not distended is often likewise the seat of catarrh, or is put out of place, or rendered impervious by bands resulting from perimetritis.

Diagnosis.

As all symptoms are often wanting, or are very slight, the condition is usually met with accidentally at the autopsy.

Primarily the diagnosis may be established, by thorough combined examination, from the form of the tumor, which begins near the uterine end with slight distention, and increasing in size and thickness as it goes outwards, assumes a lengthened nodulated form. Together with this we find constrictions caused by flexures of the swollen tube, and also often by pseudo-membranes.

If only a part of the tube is closed, so that the dropsical tumor is roundish, or if it has attained a very marked size, so that its characteristic shape has disappeared, it cannot well be distinguished from cysts of the ovaries or of the broad ligament. Great mobility of the dropsical tube, which Simpson emphasizes as essentially aiding the diagnosis, is certainly not always present, as there are very often adhesions.

In one case I was able to make the diagnosis from the

sensation of several small tumors lying close together, which, beginning near the uterine orifice of the tube, extended outwards like a string of beads, and could not well be referred to any other organ.

Prognosis.

If we disregard the fact that occlusion of a tube may lead to tubal pregnancy, life will seem not to be much endangered, as the dropsical tumor of the tube has no tendency to rupture into the abdominal cavity ; but its discharge through the uterus must be considered a favorable result.

Treatment.

Tumors of moderate size, furnishing no symptoms, or only slight ones, are not apt to come to the knowledge of the physician. Larger tumors, if they occasion material difficulties, are to be punctured, preferably from the vagina. The aspirator or an exploring needle may be used, as the thin, clear fluid flows easily. Simpson reports the cure of eight patients in this way.

HEMORRHAGE OF THE TUBE.

Slight effusions of blood in the mucous membrane, or hemorrhages into the canal of the tube, seem not to be rare at the time of menstruation and when there are inflammatory processes in the uterus, and also in acute infectious diseases. They have no special significance, as the blood is usually reabsorbed, and they do not result in rupture of the tube ; still, they may acquire importance by the passage of the blood through the ostium abdominale into the abdominal cavity. Apart from tubal pregnancies and blood-cysts in the tubes in cases of hæmatometra, the hemorrhage is scarcely ever so important as to cause death. It is only exceptionally, too, that death is due to peritonitis ; as a rule, the collection of blood becomes encysted in the lower part of the abdomen, and it is possible that primary effusions of blood, by plugging the canal of the tubes, may lead to hydrosalpinx. For further particulars we refer to the article on retro-uterine hæmatocele.

INFLAMMATION OF THE TUBES.—SALPINGITIS.

Förster, Wiener med. Woch., 1859, Nos. 44 and 45.—*Hennig*, Der Katarrh der inneren weibl. Geschlechtstheile, 2d ed.—*Klob*, Pathol. Anat. d. weiblich. Sex., 1864, p. 302.

Apart from puerperal salpingitis, which is very frequent, the higher grades of inflammation of the mucous membrane are rare, although slighter degrees of tubal catarrh seem to occur rather frequently.

The anatomical condition is that which is usually present in catarrhs of mucous membranes. In acute catarrh we find hyperæmia, injection, swelling, and increased secretion of the mucous membrane; in chronic catarrh it is again smoother and of a slaty color. The secretion may become purulent, but, when it lasts long, ultimately becomes purely serous.

The inflammation readily extends to the adjacent peritoneum, and so causes numerous cicatricial adhesions between different portions of that membrane. An extension of the process to the mucous membrane of the uterus is scarcely ever made out, and probably this peculiarity is due to the fact that the infectious secretion of the tube passes readily into the abdominal cavity, but not into the uterus.

Besides, the simple catarrhal secretion being slowly discharged, causes no irritation in the peritoneum, or only a slight degree of it, while the effusion of pus through the ostium abdominale sets up an acute peritonitis which runs a rapid course. The accumulation of pus in the tube—pyosalpinx—may even lead to ulceration of the mucous membrane and perforation, which takes place into the abdominal cavity, if there have been no previous adhesions. Förster observed two such cases. Wagner witnessed it in a pregnant woman.¹ Von Dessauer² and Wylie³ have also seen cases of this kind. If adhesions have formed, the perforation may take place into the rectum, less frequently into the bladder, intestine, or vagina.

¹ Monatsschr. für Geb., Vol. XIV., p. 436.

² Monatsschr. für Geb., Vol. XXVII., p. 60.

³ Amer. Jour. of Obst., VI., p. 43.

Salpingitis presents symptoms only when by extension of the inflammation, by escape of the secretion, or by rupture, it leads to peritonitis. Consequently the diagnosis is not established till too late, or not at all, although it must be possible under favorable conditions to feel the swollen tubes through their coverings.

DISPLACEMENTS OF THE TUBES.

Dislocations of the tubes are exceedingly frequent, but are almost always the consequence of other anomalies, so that they have only a secondary importance.

Thus it happens that, with displacements of the uterus, with versions, flexions, and particularly prolapsus and inversions, there are corresponding dislocations of the tubes. In hernias of the genital canal the ovaries and tubes are primarily displaced, and the uterus follows them. (For more particulars see the article on ovarian hernia.) The case observed by Berard¹ is quite unique. Here the swollen tube alone, unaccompanied by ovary or uterus, lay in the sack of a femoral hernia.

The changes in the tubes become especially marked when there are tumors of the uterus or ovaries. In such cases they not only undergo noticeable alterations in position, but also in their shape, being often enormously drawn out lengthwise, and even becoming detached from the uterus by the traction of the growing tumor.

A very frequent cause of displacement is furnished by the adhesions of perimetritis, which may draw the tubes forwards or backwards, most frequently into Douglas's space, and fasten them in those positions. The importance of all these dislocations depends almost exclusively upon their relations to physiological processes, notably conception, although they may—especially the adhesions and false membranes, as mentioned above—even cause stricture of the canal.

NEOPLASMS OF THE TUBES.

Fibroids are very rare, and always of small size. Simpson²

¹ L'expérience, Avril, 1839.

² Diseases of Women, p. 541.

is the only one who has seen a fibroid, as large as a child's head, growing from the left tube. They develop in the continuity of the tube, in its walls, or in the fimbriæ of the ostium abdominale. They have no practical significance; they never diminish the calibre of the tube, owing to the fact that they grow outwards.

Lipomata, likewise of very small size, occur between the folds of the broad ligament at the lower margin of the tubes; it is very exceptional for them to attain the size of a walnut.

The *cysts*, which are very often met with at the periphery of the tubes, are without any significance, as they do not much exceed the size of a pea. The terminal hydatids of Morgagni have only an embryological importance (see p. 338).

Carcinoma is never of primary occurrence in the tubes, and only in very rare instances does it occur as a true metastasis. Scanzoni¹ saw one case of medullary cancer of the right ovary where the mucous membrane of the left tube was infiltrated with cancer. Thus cancerous destruction of the tubes is only seen when carcinoma, springing from the ovary or peritoneum, very seldom from the uterus, involves the tubes in the degeneration, and even in these cases they often remain for a long time intact. So in carcinoma of the ovary, we not infrequently find the tube lying in the cancerous mass, but having no share in the new formation.

Tuberculosis of the mucous membrane of the tubes, on the contrary, is much less rare, and even occurs quite frequently as primary tuberculosis, even before puberty.

It starts from the mucous membrane of the abdominal end, and begins with the formation of small nodules in the mucous membrane, accompanied with catarrhal symptoms. As a consequence, the canal gets filled with a muco-purulent mass, which subsequently becomes caseous. Tuberculous ulcers are also found on the mucous membrane. At a later stage, when the mucous membrane degenerates into a grumous tuberculous mass, the tubes are converted into thick canals, giving a sense of rigidity.

The neoplasm may pass from the mucous membrane to the

¹ Krankh. der weibl. Sexualorg., 4th ed., Vol. II., p. 79.

muscular coat and the peritoneum, and may actually lead to perforation of the tube. It may even involve the mucous membrane of the uterus secondarily.

It would be possible only in very exceptional instances to establish the diagnosis, at least if the tuberculosis of the tubes be primary.

DISEASES OF THE OVARIES.

Malformations.

Complete Absence.

Kussmaul, Von dem Mangel u. s. w. der Gebärmutter. Würzburg, 1859, p. 43, etc.
—*Klob*, Pathol. Anat. d. weibl. Sex. Wien, 1864, p. 328.—*Rokitansky*, Allg. Wiener med. Woch., 1860, Nos. 2 to 4.—*Heschl*, Oesterr. Zeitschr. f. prakt. Heilk., 1862, No. 20.

Absence of both ovaries occurs in connection with absence of the uterus, in which case we have to do, strictly speaking, with sexless individuals, according to *Kussmaul*. We have referred to the want of one ovary in uterus unicornis, when speaking of malformations of the uterus.

The want of an ovary may even, though congenital, still be acquired, as when the uterine appendages of one side, as a result of inflammatory processes during foetal life, or of being twisted on their axes, are tied off from the rest of the genital apparatus. If this takes place early, they may be absorbed and disappear without leaving any trace; but they may also contract adhesions in other places, or, as shown in the case of a child three weeks old, reported by *Heschl*, may degenerate into a sort of cyst. In these cases the rest of the genital apparatus is normal, and only the appendages of one side are cut off, as it were, at a certain spot.

Rudimentary Formation.

A rudimentary formation of the ovaries occurs also with several varieties of malformation of the uterus, as in case of complete absence of it, with a rudimentary uterus, and with uterus

bipartitus and foetalis. They may present various appearances in these cases. In the lowest grade of development they consist simply of a stroma without a deposit of Graafian follicles, although in these cases, strictly regarded, the feminine character of the individual is not to be recognized, for it is only the Graafian follicles with the ova that constitute the ovary as the female sexual gland.

In other cases there are traces of imperfectly developed or blighted follicles, as in W. Merkel's¹ case. Eppinger² has described in detail a highly interesting case of rudimentary formation of the ovaries. Two ovaries, of the size of the head of a probe and a hemp-seed, characterized by small, degenerated, but unmistakable follicles, were found with the remnant of a very rudimentary double genital canal. Single, well-formed follicles may, however, be present even in rudimentary ovaries.

A rudimentary formation occurs on one side in cases of uterus unicornis with a rudiment on the other side.

Supernumerary Ovaries.

There is one case reported by Grohe,³ and one by Klebs,⁴ in which three ovaries were present, two on one side.

HYPERÆMIA AND HEMORRHAGE.

At every period the ovaries are involved in a physiological hyperæmia, which may exceptionally become great in degree, or long continued, but which has no further significance, so long as it does not pass either into hemorrhage or inflammation.

An effusion of blood is not perhaps invariably associated with the bursting of the Graafian follicle, although this very commonly takes place, and then forms the centre of the corpus

¹ Beiträge zur pathologischen Entwicklungsgeschichte, etc. Diss Inaug. Erlangen, 1856, p. 17.

² Prager Vierteljahrschr., 1873, 4, p. 2.

³ Wiener Medicinalhalle, 1863, No. 43.

⁴ Monatsschr. für Geb., Vol. 23, p. 405.

luteum. But in exceptional instances there may be such considerable effusions into the follicle as to form regular blood-cysts, or, when the recently ruptured follicle permits free escape of the blood, to occasion a hemorrhage into the abdominal cavity. Such a hemorrhage may, 1st, prove directly fatal; 2d, may lead to fatal peritonitis; 3d, may form an encysted collection of blood in the abdominal cavity; or 4th, may cause a retro-uterine hæmatocele.

Blood-cysts of the ovary may be developed from the follicle, if either it does not rupture at all, as may happen when the tunica albuginea is abnormally thickened, or when there is an investment of false membranes, or if the seat of rupture is obstructed by coagula, or has already closed again by the time the bleeding occurs.

These blood-cysts ordinarily attain the size of a walnut only, but exceptionally that of the fist. They most frequently end by gradual inspissation and partial absorption. Rupture may also occur, however, with the result already mentioned, or the sac may ulcerate and break down.

It is very unusual to have more considerable interstitial bleedings between the meshes of the stroma, although small hemorrhages frequently occur, especially in acute blood-diseases.

Schultze¹ saw in a still-born child a sanguineous tumor of the right ovary, which had evidently been formed gradually; the blood had destroyed the tissue proper of the ovary.

The sanguineous tumor of the ovary is not to be distinguished by its symptoms from other tumors which present a moderate degree of enlargement, and the diagnosis cannot be established, at least not from the objective examination. As arguing against other tumors, the rapid formation and equally rapid diminution of the tumor may be of importance when these features are observed.

If rupture takes place, the results follow which are mentioned above, although it is only in very exceptional instances that the source of the hemorrhage is recognized during life.

¹ Monatsschr. f. Geb., Vol. XI., p. 170.

INFLAMMATION OF THE OVARY.—OÖPHORITIS.

Chéreau, Mém. pour servir à l'étude des mal. des ovaries. Paris, 1844.—*Tilt*, Diseases of Menstruation and Ovarian Inflamm. London, 1850.—*Raciborsky*, Gaz. des hôp., Nov., 1856.—*Gailard*, Gaz. des hôp. Juillet-Octobre, 1869.—*Schultze*, Jenaische Z. f. Med u. Nat. I., 1864, p. 279.—*Klob*, Pathol. Anat. d. weibl. Sex. Wein, 1864, p. 378.—*Duncan*, Edinburgh Med. Journ., Sep., 1871, p. 193.—*Slavjansky*, Arch. f. Gynaek., Vol. III., p. 183.

We do not here consider the most frequent form of oöphoritis, the puerperal.

Etiology and Mode of Occurrence.

Two forms of oöphoritis are to be distinguished, the parenchymatous or follicular, in which the tissue proper of the gland—the Graafian follicles—is inflamed, and the interstitial, in which the connective-tissue stroma is inflamed.

Inflammation of the glandular part of the Graafian follicles is, according to the investigations of Slavjansky, very frequent, occurring as it does in acute febrile diseases in which we also meet with parenchymatous inflammations of other glands of the abdomen. Of course, the inflammation has in itself no special gynecological significance. It is only of importance in so far as, when it attains a very high degree, it may end in destruction of all of the follicles, and so result in sterility.

Besides this, the parenchymatous form also occurs associated with inflammation of the neighboring serous membrane, as in perimetritis and peritonitis. Even in these cases it has only a secondary importance, as the changes in the peritoneum are far greater and more dangerous.

Except in the puerperal period, the interstitial form is extremely rare. It is likewise met with as an extension of a peritonitis, and in those cases where there is suppression of the menses.

Pathological Anatomy.

In the parenchymatous inflammation we find the Graafian follicles inflamed, and, in fact, when the inflammation has ex-

tended to the ovary from the peritoneum, those lying nearest the periphery are most affected. In acute infectious diseases, on the contrary, the primordial follicles are the first to be inflamed, and the process then extends to the more mature ones.

The cells of the membrana granulosa are in the state of cloudy swelling, and subsequently they break down into fine granules; the ovum is likewise degenerated. The contents of the more mature follicles have a milky turbidity from the broken-down cells of the membrana granulosa. The layer of the stroma surrounding the follicle is likewise inflamed.

The interstitial inflammation is purely an inflammation of the connective tissue. The connective tissue is found hyperæmic, swollen, infiltrated with fluid, and filled with emigrated white blood corpuscles. The infiltration with small cells may be so considerable that abscesses are formed. Generally, however, the infiltration results in cicatricial shrinking. If the inflammation runs very high, it also extends to the follicles.

Symptoms and Results.

We cannot properly speak of peculiar symptoms, since oöphoritis occurs as an accidental affection in other important and dangerous diseases. The sensitiveness of the diseased ovary, which is always present, is due to the participation of its covering.

In the parenchymatous form of inflammation, sterility may be the result, from all the follicles being destroyed. Still, it is not yet positively known whether the glandular tubes, from which the follicles come by a process of separation, continue to remain, or whether, even in the adult woman, they are not newly formed from the epithelium of the ovary. Koster¹ states that he has found in the bodies of puerperal women of thirty-two and thirty-seven years, as well as in those of young girls of sixteen and seventeen years, depressions of the epithelium into the stroma, and at the bottom of the depressions primordial ova, while beneath the depressions he found young follicles. The case ob-

¹ Virchow-Hirsch'scher Jahresber. über 1872, Vol. I., p. 52.

served by Slavjansky,¹ of glandular tubes without ova, which had undergone cystoid degeneration in the ovary of a woman of thirty years, has of course only the significance attaching to unconsumed glandular tubes left behind. Very probably the inflamed follicles may also degenerate into cysts.

In the interstitial form, also, when the inflamed connective tissue undergoes cicatricial contraction, the follicles may be destroyed by compression. In addition to this, sterility may result from thickening of the peripheral layers of the ovary, so that they no longer burst, and thus do not allow of the escape of the ovum.

Abscesses may form as the result of interstitial oöphoritis. If we may draw conclusions from the small number of non-puerperal cases well established by observation, they have a great tendency to break into the bladder. West² saw such a perforation into the bladder and intestine, Mosler³ also one into the bladder, and Edis⁴ observed an ovarian abscess, with perforation into the abdominal cavity, in a girl of twelve years old. I have myself seen, at the autopsy of a woman dying of tubercular peritonitis, an ovarian abscess in a retrograde stage. The whole ovary was converted into a tumor almost the size of a hen's egg, from which there flowed on section a thick, creamy, yellow fluid. This inspissated abscess had been the starting-point of a general tubercular infiltration, involving also the uterus.

Oöphoritis is complicated with, and often proceeds from a perioöphoritis, which leads to pseudo-membranous deposits upon the ovary, and to adhesions with neighboring organs.

Diagnosis.

By some gynecologists the diagnosis of oöphoritis is often made, when they find, for example, a sensitive tumor at the side of the uterus. We are of the opinion that in such cases we have, as a rule, to deal primarily with a perimetritis, and that even if

¹ Bull. de le Soc. Anatom. de Paris, Dec., 1873.

² Lehrb. der Frauenkrankh., 3d ed., p. 586.

³ Monatsschr. f. Geb., Vol. XVI., p. 133.

⁴ London Obst. Tr., Vol. XIII., p. 99.

the ovary lies within the tumor, the inflammation of the peritoneum is the more important disease. An affection of the gland alone can be diagnosticated with some certainty only when a sizable roundish tumor is felt at the ordinary place of the ovary, and this is sensitive, while its immediate surroundings have their normal relations.

The diagnosis of ovarian abscess is also very difficult. By combined examination only we succeed in diagnosing an ovarian tumor with fluid contents. It would be difficult to distinguish it with certainty from a cyst by the sensitiveness, since even an ovarian abscess might easily exhibit no considerable sensitiveness; and, on the other hand, too, the covering of a cyst may be inflamed. A rapid growth of the tumor speaks in favor of its having purulent contents. But even after the purulent character of the contents is positively settled by puncture, aspiration, or spontaneous rupture, it may still be difficult to decide whether we have to deal with an ovarian abscess or a cyst which has suppurated. As circumstances favoring the former view are the acute development and rapid course of the tumor after suppression of the menses.

Treatment.

In simple oöphoritis it may easily happen that there is no chance for treatment. When there is great sensitiveness we are to treat it as we would a case of perimetritis. Abscesses are to be evacuated, when possible, through the vagina, by means of a fine trocar or the aspirator.

DISPLACEMENTS OF THE OVARY.—OVARIAN HERNIA.

Déneux, Sur la hernie de l'ovaire. Paris, 1813.—*Mulert*, Journal für Chirurgie, 1850, IX., 3.—*Loumagne*, De la hernie de l'ovaire. Paris, 1869.—*Englisch*, Medicinische Jahrbücher, 1871, p. 335.—*McCluer*, Amer. Jour. Obstet., VI., p. 613.

Inguinal Hernia.

Etiology and Anatomy.

Inguinal herniæ, in the majority of cases at least, are congenital (of twenty-three cases, in which the previous history was

known, Englisch found seventeen congenital). Their origin is due to the development of a processus vaginalis peritonei like that in the male, and this remaining open guides the ovary (the same as the testicle in males) into the external labium. Inguinal herniæ are not infrequently found double (Englisch found, out of twenty-seven cases of inguinal herniæ, nine double ones, all of which were probably congenital). This abnormal development, which is analogous to the development which we find in males, occasionally occurs in connection with malformation of the genital organs, though more frequently it is independent of any such malformation.

An acquired inguinal hernia is most apt to occur during a confinement, where a hernia has existed previously. A case reported by Loeper¹ is in support of this statement, and the third case referred to by Englisch may also doubtless be interpreted in the same way—"traumatic origin of a hernia in the eighth month of pregnancy; ovarian hernia in childbed." Whenever a hernial sac exists it is obviously most liable to become occupied by the ovary during parturition. Moreover, the production of an acquired inguinal hernia is without doubt often facilitated in consequence of the development of an open vaginal process of the peritoneum. The displaced ovary frequently becomes inflamed (the fact that Englisch found the ovary inflamed in seventeen cases out of thirty-eight, is naturally owing to the circumstance that, as a rule, it is the inflammation of the organ which first leads the physician to detect the hernia; in five cases the ovary had undergone cystic, and in one case cancerous, degeneration).

Symptoms.

The entire contents of the hernia, which is generally pear-shaped, consist of the ovary, and the displacement is almost always irreducible in those cases in which it is congenital. The tumor varies in size from that of a walnut to that of a hen's egg, rarely (in cystic degeneration) being larger. When the tumor is small, it bears a very striking resemblance to swollen inguinal

¹ Monatsschr. f. Geb., B. 28, p. 453.

glands, which have the same consistency. It is almost always tender on pressure. In some cases there is scarcely any pain, while in others the pain is unendurable. Inflammatory symptoms may appear also, which may either wholly subside or may go on to suppuration and even to gangrene.

Diagnosis.

The presence of a hernia is recognized by the usual methods. That the ovary forms the contents of the hernial sac is evinced by its shape, consistency, and especially by its connection with the uterus, as ascertained by moving the latter either with the finger or with the uterine sound. In many cases the displaced ovary swells very perceptibly at the menstrual periods, and its tenderness on pressure becomes decidedly increased.

I have seen one case of inguinal hernia of the right ovary in which there could be no doubt about the diagnosis. While the left ovary could be felt lying rather far back, but in every other respect normal, nothing resembling an ovary could be found among the uterine appendages on the right. On this side, however, the uterine appendages (Fallopian tube, ovarian ligament) were drawn down towards the inguinal canal, and in front of them lay a body of the size and form of the ovary in a little hernial sac. This body was only slightly sensitive on deep pressure, and the patient had not noticed that it ever appeared swollen during the menstrual periods. On grasping it externally with one hand, and with the other pushing the uterus backwards and toward the left, a decided traction could be exerted upon the body in the hernial pouch; it would slip upwards and outwards from between the fingers which held it, but it could not be drawn through the inguinal canal, nor could it be replaced by external manipulation.

Treatment.

The simple reduction is usually not practicable; the attempt to reduce a congenital hernia would be as unsuccessful as an effort to replace a testicle within the abdominal cavity. If there are no further symptoms beyond the mere displacement, it is only necessary that the patient wear a concave shield, so as to protect the ovary from any external injury.

If the ovary becomes inflamed, the treatment must be antiphlogistic. If suppuration begins, the pus should be removed. Herniotomy, with replacement of the ovary within the abdom-

inal cavity, is only applicable to acquired herniæ, since the replacement in congenital cases is not practicable. In the former class of cases Neboux¹ and Loeper² have operated successfully.

In case the pains are very severe, if at the periods of menstruation they become intolerable or interfere with all active exertion, the question of removing the ovary may arise, and in cases of cystic degeneration this becomes an absolute necessity. Pott,³ Lassus,⁴ Meadows,⁵ McCluer,⁶ and Deneux,⁷ have performed this operation successfully; while Holmes,⁸ Guersant⁹ and Englisch¹⁰ operated with fatal results.

The other varieties of ovarian hernia are of much less frequent occurrence, the commonest of them being the crural herniæ (Englisch found nine of this variety among thirty-eight cases of ovarian hernia), which, so far as symptoms, diagnosis, and treatment are concerned, are allied to the inguinal variety of hernia. It is difficult to explain their origin; they do not, however, occur on both sides unless they are congenital.

The displacement of the ovary in the other varieties of hernia, especially in ischiatic hernia, is almost always of secondary importance. In abdominal hernia the ovary is contained in a hernial sac formed by the cicatrix of a wound (Cæsarean section). Kiwisch¹¹ saw one case in which the ovary and Fallopian tube of the right side were forced through the widened vascular canal of the foramen ovale.

PROLAPSE OF THE OVARY.

Rigby, Med. Times and Gaz., July 6, 1850.—*Veit*, Krankh. d. weibl. Geschlechtsorgane. Erlangen, 1867, 2 Aufl., p. 468.—*Warner and Storer*, Boston Gynec. Jour., VI., p. 324.

¹ Bulletin de thérapepie, Avril, 1845, and Arch. gén. de méd., Septembre, 1846.

² Monatsschr. f. Geb., B. 28, p. 453.

³ Œuvres chirurg., T. I., p. 492.

⁴ Pathol. chir. Paris, 1806, II., p. 98.

⁵ Trans. Lond. Obstet. Soc., III., p. 438.

⁶ Ibid.

⁷ Ibid. A case of crural hernia.

⁸ Lancet, January, 1864.

⁹ Bull. de therap., 28, 1865. Two cases.

¹⁰ L. c., p. 340.

¹¹ Klin. Vorträge, etc., II. Aufl., B. II., p. 39.

An abnormally low position of the ovary is a condition which is very frequently met with, but has received heretofore very little attention. This displacement depends upon an increased weight of the ovary, and more especially on a relaxed condition of the broad ligament of the affected side. The ovary is in these cases sensitive, and becomes inflamed, either primarily or as the result of injuries (through pressure of the uterus and rectum, from sexual intercourse, or from the use of pessaries), to which it is liable on account of change in position. Both ovaries are rarely displaced in this way.

A prolapsed condition of the ovary gives rise to various symptoms, especially to abdominal pains, which come on suddenly, and are very severe during sexual intercourse, as well as in difficult defecation. Sometimes well-marked paroxysms of pain occur, which, especially during defecation, are sometimes extremely severe.

The diagnosis is made by means of the combined method of examination, when the small sensitive tumor, with its characteristic form, is felt on one side of the posterior cul-de-sac of the vagina.

The question of treatment is one of great difficulty. Beside a strengthening and nourishing diet, complete freedom from all hurtful influences, rest, and even bloodletting, are indicated in cases where there is any marked inflammation of the prolapsed ovary. In addition to this, care must be taken to render defecation as easy as possible. If the patient's constitution is good, we may hope that the prolapsed condition of the ovary will gradually become relieved; yet it is not only in cases where the ovary is bound down by adhesions in Douglas's cul-de-sac that this hope is disappointed.

We shall speak under the head of ovarian cysts of another peculiar displacement of the ovary, which occurs most frequently in connection with tumors, and which is characterized by a twisting of the ovary on its own axis.

NEW FORMATIONS IN THE OVARIES.

Cysts and Cystomata.

Of the immense amount of literature which has been published on the subject of ovarian cysts, we shall here only mention those works which treat of the sub-

ject at large, while we shall refer, in their appropriate places, to those special works which relate to the anatomy, diagnosis, and treatment of these growths.

Roederer, Progr. de hydropse ovarii. Gott., 1762.—*Bright*, Guy's Hosp. Rep., VI.—*Th. S. Lee*, On Tumors of the Uterus and its Appendages. London, 1847, p. 115.—*Martin*, Eierstock-Wassersuchten. Jena, 1852.—*Baker-Brown*, On Ovarian Dropsy. London, 1862.—*Spencer Wells*, Diseases of the Ovaries. London, 1872.—*Peaslee*, Ovarian Tumors; their Pathol., Diagnosis, and Treatment, esp. by Ovariectomy. New York, 1872.—*Atlee*, Gen. and Differ. Diagnosis of Ovarian Tumors, etc. Philadelphia and London, 1873.

Etiology and Mode of Occurrence.

Very little is as yet definitely known concerning the origin of ovarian cysts, but whatever idea may be rationally maintained as to their origin will be expressed when we come to consider the anatomical relations of their development. We will only say here, that while it is possible to comprehend the etiology of dropsy of the Graafian follicle, we yet know nothing definitely with regard to the origin of a true cystoma. The first trace of the cyst, the ovarian follicle, is probably always congenital; indeed, we shall have to go even further than this, inasmuch as small degenerated cysts are frequently found in new-born infants, a fact which seems to prove that the very beginnings of the tumor-formation are congenital, and that these beginnings persist for a long time (almost always until after puberty) without further development.

Scanzoni¹ lays stress on the fact that ovarian tumors are especially apt to occur in women who were formerly chlorotic, and explains this by saying that in chlorotic women the menstrual congestion merely causes the follicle to swell without rupturing. This explanation, however, while sufficient for those rarer cases of dropsy of the Graafian follicle, does not apply to the cystoma.

Statistics furnish but little that is decisive as to their mode of occurrence. As regards age, the only thing that can be stated definitely, is the age at which they first appear. Among 348 cases reported by Lee, Scanzoni, West, and the writer, 97 appeared before 30 years of age; 145 between 30 and 40; 70

¹ Beit. z. Geb. u. Gyn., V. p. 170.

between 40 and 50 ; 31 between 50 and 60 ; 3 between 50 and 70, and 2 between 70 and 80.

Before puberty ovarian tumors occur exceedingly rarely. Wegscheider¹ reports that he once saw a large cyst in a young girl only twelve years of age, and Goodrich² saw one in a child only eight years old. Pooley³ has recorded a case of ruptured cyst in a child only three years and two months old, and Peaslee⁴ punctured one in a little girl only five years old. Carr⁵ met with an ovarian tumor in a child of three years of age, which was first noticed when the patient was only fifteen months of age. Ovariectomy has at various times been performed on children (although oftener for the removal of dermoid cysts), and Alcott⁶ reports a case in which he performed the operation on a child three years of age, with a fatal result.

Sexual indulgence certainly does not predispose to cystic degeneration, but rather the opposite is true.

A very important practical question is with regard to the frequency of double ovarian disease. Scanzoni⁷ has answered this question, in a manner which apparently admits of no contradiction, by referring to the records of post-mortem examinations. From these it appears that, out of ninety-nine cases, the disease was single in forty-nine and double in fifty, a result which not only proves the frequency of double disease, but also serves as a weighty argument against the operation of ovariectomy.

Nevertheless, experience shows that extensive cystic degeneration of both ovaries does not occur very frequently, and moreover, that a recurrence of the disease in the other ovary, so as to render necessary a second performance of the ovariectomy, is a comparatively rare event. In five hundred ovariectomies Spencer Wells has removed both ovaries in only twenty-five cases, and

¹ Berlin. Beitr. z. Geb. u. Gyn., I., p. 35.

² Amer. Jour. Med. Sci., April, 1873, p. 500.

³ Amer. Jour. Obstet., V. p. 393.

⁴ E. I., p. 396.

⁵ Boston Gynec. Jour., VII., p. 259.

⁶ Lancet, February, 1872.

⁷ Würzburger med. Zeit., 1865, VI., p. 1.

instances in which the operation was twice performed on the same patient are extremely rare.

The statistics collected by Scanzoni, and the experience of ovariotomists confirm the opinion that although very frequently the other ovary is not perfectly healthy, and other diseases, or even the first traces of cystic degeneration, are sometimes found in it, these latter, as a rule, undergo no further development, and hence a simultaneous degeneration of both ovaries into large cysts, as well as the development of a cyst in the second ovary, after the first had been removed, is a rare occurrence. This last statement is also supported by the statistics which Scanzoni collected, since he has reckoned under the head of double disease all those cases in which any pathological change whatever was found in both ovaries, while out of the ninety-nine cases there were, in fact, only four in which a cyst as large even as a hen's egg was found on both sides.

Pathological Anatomy.

M. Baillie, Morbid Anatomy of the Human Body. London, 1793, p. 263.—*Hodgkin*, Medico-chirurg. Transac., Vol. XV.—*Biermann*, De hydropse ovarii. Diss. Inaug. Götting., 1846.—*Frerichs*, Ueber Gallert- oder Colloid-geschwülste. Göttingen, 1847.—*Rokitansky*, Denkschrift über die Cyste. Denkschr. d. k. k. Akademie der Wissenschaften. Allgem. Wiener med. Z., 1859, Nos. 34, 35; Wiener med. Jahrb., 21, II., p. 132; Lehrb. d. pathol. Anat., 3 Aufl., III., p. 419, and Wochenbl. d. Ges. d. Wiener Aerzte, 1855, I.—*Virchow*, Das Eierstocks-Colloid. Verh. d. Berliner geb. Ges., B. III., p. 197.—*Führer*, Deutsche Klinik, 1852.—*Wilson Fox*, Medico-chirurg. Transactions, Vol. XLVII., 1864.—*Forster*, Handb. d. pathol. Anatomie. Leipzig, 1863, p. 380.—*Spiegelberg*, Monatssch. f. Geb., XIV., pp. 101 and 200.—*Eichwald*, Colloidentartung der Eierstöcke, Würzb. med. Z., B. V., 1864, p. 270.—*Klebs*, Virchow's Archiv, XLI., p. 4, and Handb. d. pathol. Anat., 4 Lief. Berlin, 1873, p. 789.—*Mayweg*, Die Entwicklungsgeschichte der Cystengeschwülste des Eierstocks. Diss. Inaug. Bonn, 1868.—*Böttcher*, Virchow's Archiv, XLIX., 1870, p. 298.—*Waldeyer*, Die Eierstockskystome, Archiv f. Gyn. I., p. 252.—*Rindfleisch*, Lehrb. d. pathol. Gewebelehre, 2 Aufl., 1861, p. 466.

In describing the anatomical structure of ovarian cysts, we follow essentially the clear description which Waldeyer has given, in which he endeavors to consider them as all formed according to one general plan.

With reference to their histology and development, we must clearly distinguish two kinds of cystic formations in the ovary (leaving for the present dermoid cysts entirely out of view), namely, the *dropsy of the Graafian follicle* and the cystic tumor or *cystoma*.

While the latter is to be regarded as a glandular new formation (adenoma), with a secondary cystic formation, which arises from the follicles of the ovary, the dropsy of the Graafian follicle represents a so-called retention-cyst, and is to be considered in the same group with tubal dropsy, hæmatometra, etc. The only difference is, that in the latter cases the natural way of escape is stopped up, while in dropsy of the Graafian follicle the physiological rupture has taken place within a closed cyst, in consequence of which the cyst becomes enlarged. That cysts may form from Graafian follicles has been unquestionably demonstrated by Rokitansky,¹ who found the ovum in all cysts not exceeding the size of a bean. Webb, also, and Ritchie² have found ova in the cysts.

Follicular dropsy consists of a considerable collection of fluid within the follicle. In order to be regarded as a dropsy, the amount of fluid must, of course, vary with the age of the individual. In new-born children there is no liquor folliculi normally secreted; if, then, the follicles are found distended with fluid, the case is one of follicular dropsy. The dropsical follicles in new-born children lie rather toward the centre of the ovary. In adults these retention-cysts only exceptionally attain any considerable size (but in very rare cases may become as large as a man's head). They may occur singly, while in other cases "the whole ovary becomes, through a repetition of the same process in numerous Graafian follicles, converted into a tolerably large tumor, which presents on section a multilocular cystic appearance" (Waldeyer). These cysts have a smooth wall, no projecting septa, and their contents consist of a clear, transparent serum.

The origin of the cysts is doubtless partly owing to the

¹ Wochenbl. der Zeitschr. der Gesellsch. der wien. Aerzte, 1855.

² Spencer Wells, Diseases of the Ovaries. London, 1872, p. 42.

causes which hinder the rupture of the follicle. Sometimes, when a follicle is physiologically ready to burst, the rupture does not take place, either because the follicle has not developed towards the free surface, but rather in the direction of the base of the ovary and between the layers of the broad ligament, or because the surface of the ovary is covered with an exudation, the product of some inflammatory process, which prevents the rupture from taking place. In many cases, doubtless, the follicle is obliterated, but the secretion may remain, and so give rise to the production of a cyst. In any individual case it is rare that this process can be demonstrated; yet Chrobak¹ saw a retention-cyst of the follicle after a pre-existing peritonitis.

In other cases, as is shown more especially in the specimens of new-born children, it is not so much the resistance of the follicle to rupture that is concerned, as a premature and very gradually increasing abundant secretion in the follicle, and the follicle does not rupture, even at a later time, for the very reason that the secretion increases so very slowly, and the sudden pressure that usually occurs during the menstrual period is either wanting or is too slight to occasion a rupture.

It is, moreover, possible, as Rokitansky² first demonstrated, for a cyst to form from a ruptured Graafian follicle, in other words, from a corpus luteum, and this probably takes place in this way: after the closure of the opening where the rupture took place, and after the formation of the corpus luteum, the kernel of the latter becomes a cyst. I have myself seen one such case, in which there was a cyst of the corpus luteum in the ovary of a patient who had died of hemorrhage during a miscarriage. Next to the wall of the cyst came the yellow layer of the corpus luteum, and then the white coat of the ovary.

Under the head of *ovarian cystomata* are comprised tumors of the most various description, to understand which it is first necessary that we should consider their peculiar mode of origin.

According to Waldeyer, cystomata are really epithelial

¹ Wien. med. Presse, 1872, No. 42.

² Allg. Wiener med. Z., 1859, No. 34, and Lehrb., 3 Aufl., p. 48.

tumors, that is, they are formed from true superficial or glandular epithelium, and their formation proceeds from the actual parenchyma of the ovary, or, in other words, from its glandular structure. (The ovary consists of two elements, the connective-tissue stroma and the glandular parenchyma; the latter is developed by the epithelium of the mucous membrane covering the ovary growing into the connective-tissue stroma, thus forming glandular pouches. The Graafian follicles, with the eggs, are formed from the follicles of Pflüger, through a division and metamorphosis of the epithelium.) But the cystomata are not formed from the matured Graafian follicles, but from those preliminary structures out of which the latter are themselves developed, namely, the glandular follicles. Since normally the formation of follicles from the glandular pouches appears to be completed at a very early period of childhood (we find glandular follicles still existing even in new-born children), it must be supposed either that a new formation of glandular follicles takes place later in life, or that undeveloped remnants of the foetal glandular follicles are left remaining in the ovary. The possibility of new formations appearing later on in life cannot be denied, although there is only one observation recorded of it. Köster¹ found in two women, thirty-two and thirty-seven years of age, who had been recently confined, as well as in two young unmarried girls of sixteen and seventeen years of age, depressions of the epithelium extending into the stroma, and at the bottom of each depression primordial eggs; beneath the depressions were young follicles. In the second place, the glandular follicles may remain unaltered or in a state of more or less marked cystic degeneration until late in life, as shown apparently in the observations made by Slavjansky,² who found in the ovary of a married woman, thirty years of age, glandular follicles without eggs, but in a state of partial cystic degeneration; or they may develop into the completely formed glandular tumors of the cystoma, and this in rare instances may occur before puberty, but is much more common during the period of

¹ Virchow-Hirsch'scher Jahresber. über 1872, B. I., p. 52.

² Bull. de la soc. anatomique de Paris, Decembre, 1873, and Annales de gynécologie, Février, 1874, p. 126.

ovarian activity. We would especially insist that, according to our own conviction, the ovarian cystoma is not simply congenital in the sense that the foetal glandular follicles, which give rise to its development, are preserved after birth, but that small cysts (sometimes as large as peas) are themselves congenital, which remain of the same size during childhood, and later begin to undergo a further development. Small cysts with colloid contents are found so often in the ovary at the time of birth that, on the one hand, all cases of ovarian cystoma might be attributed to them, and, on the other hand, in consideration of the rarity of large ovarian cystomata in children, that it must be supposed that up to the time of puberty, or even later in many cases (in a girl twenty-eight years old I have seen cysts as large as peas), they do not undergo any further development.

Hence the cystoma is formed from the glandular follicle; the cells lying nearest the centre become softened, liquefy, and form the contents of the cyst, while from the walls of the small cysts formed in this way arise other glandular pouches. According to this simple plan are developed all the complicated forms of the cystic tumor of the ovary. The original cyst consists of a membrane,—which is really nothing more than the condensed ovarian stroma,—of epithelium lining the interior of the cyst (originally the epithelium of the glandular pouches), and of fluid contents which are partly a simple transudation from the blood, and partly metamorphosed epithelial protoplasm.

Important changes in these simple cysts depend mainly upon two causes: the fusion of many cysts into one, and the further development of the cystic wall.

The merging of several cysts into one takes place through a gradual thinning of the wall intervening between a large and a small cyst, which is due to the pressure of the two cysts against each other, in consequence of the gradually increasing growth of both. Eventually perforation occurs at some point, and the contents of the two cysts flow together. Both cysts are thus subjected to an equal pressure, and the communication between them becomes constantly larger, until finally the smaller cyst forms simply a rounded prominence upon the larger one, while flat septa, projecting into the interior, constitute the remains of

the former intervening wall. Thus the cysts gradually become merged into one another, so that ultimately these come to form only a single cyst, in other words, a unilocular cyst, and, according to Waldeyer, unilocular cysts always arise from the merging together of several smaller cysts;—the primary condition is the multilocular, while the unilocular is the ultimate product.

The cystoma undergoes still another change in consequence of the continued development of its walls. If the epithelium becomes excessively developed, external protrusions occur, and, as a result, new glandular follicles are formed at the periphery of the cyst. If the connective tissue of the wall becomes much hypertrophied, loops of connective tissue project into the interior of the cyst, which, becoming covered with epithelium, really form papillæ. Waldeyer accordingly makes a distinction between the *cystoma proliferum glandulare* and the *cystoma proliferum papillare*.

In the *cystoma proliferum glandulare* a new formation of very numerous small glands takes place in the wall of the cyst, in that the openings of the newly formed glandular pouches into the interior of the cyst become plugged up and their blind extremities then undergo a cystic degeneration by dilatation. From the walls of the follicles which have thus undergone cystic degeneration, other follicles sprout forth, which in like manner may also become cysts, so that an extensive glandular and cystic new formation takes place in the cystic walls. These cysts gradually open again into the main cyst, into which they again become merged, and in this way the most diverse forms of cystoma may be produced.

In the *cystoma proliferum papillare* the connective-tissue growth predominates. Vascular sprouts of connective tissue push the epithelium forwards into the interior of the cyst, and thus form small papillæ, which sometimes cover the inner surface of the cyst, the papillæ being very minute, but in other cases they fill up the entire cavity of the cyst with dense papillary masses; indeed, the papillary growth may be so extensive that the walls of the cyst are ruptured through the pressure exerted from within.

These two varieties may also combine, and thus may give rise to the development of the most diverse forms.

The microscopical features of ovarian cystomata are so varied, therefore, that all the different forms cannot be separately described. Hence we shall confine ourselves to a description of the mode in which they appear most commonly. Understanding, then, the preceding account of the development of these tumors, it will be easy to recognize the deviations from these typical cases.

Ovarian cystomata form tumors of all sizes. Occasionally they fill up the whole of the abdominal cavity, and they may occur in one or both ovaries. They consist of large unilocular or multilocular cysts, connected by a pedicle with the uterus. In this pedicle are to be found the ovarian ligament, the Fallopian tube, which is stretched out lengthwise and often adherent to the cyst, especially at its abdominal end, and the two folds of the broad ligament with the intervening connective tissue. The pedicle is sometimes long and narrow, and sometimes short and broad. At the point where the pedicle becomes merged into the tumor, normal ovarian parenchyma is sometimes met with; especially in the very large tumors. The entire tumor is enclosed in one main cystic wall, within which one or more cysts may be found, and almost invariably there is one principal cyst on whose periphery a number of smaller cysts are appended. Gradually the latter are merged into the main cyst, so that generally the number of cysts is greater the younger the tumor is, and in very old tumors we frequently find but a single cyst. New-formed cysts are then situated on the wall of the main cyst, and papillary growths in greater or less numbers project into the interior.

Inasmuch as the cystoma is originally a purely glandular tumor, any marked cystic formation, as well as any considerable collection of fluid within the cavity of the cyst, may be wanting. I have seen one such case, where, in performing ovariectomy for the removal of a tumor as large as a fully developed pregnant uterus, not a drop of fluid escaped through the large Veit's trocar, because the tumor was solid and consisted of nothing but glandular neoplasms which had undergone only a slight

cystic degeneration. The hyperplastic glandular substance was so soft, however, that it could be torn away from the inside of the tumor with the hand, and in this way a slight diminution in its size was effected.

The contents of the cyst are viscid, sometimes rather thin, while in other cases they consist of a gelatinous substance so thick that it does not escape even after the cyst had been laid freely open. The color is a dirty yellowish-green or brownish-red; sometimes the contents are mixed with blood. The gelatinous fluid is composed of glandular cells which have undergone a colloid degeneration and been afterwards separated and dissolved in the serous exudation.

According to Eichwald, the fluid contents of the cysts may be divided into two distinct classes of elements. The elements of the first class can always be distinguished from those of the second; on the other hand, the individual members of one class can only be separated from each other when one or more of the intermediate members are wanting.

The two groups consist of the mucous matters and the albuminous matters. In the contents of large (old) colloid cysts the elements of the second class are apt to predominate, just as the elements of the mucous class do in the contents of the younger cysts.

The first group is made up of the mucous elements, which are found to be variously modified. These are formed from the substance of the colloid bodies and from the transformed parenchyma of the cells. From this mucine is formed, which, while not soluble in water, is found in the cysts in a hydrated condition. By a series of intermediate changes the mucine becomes gradually converted into the muco-peptone, which is very readily soluble in water, for mucine by degrees assumes the property of dissolving in water and loses its peculiarity of being precipitated by acids. This substance, which, as we have seen, is produced by mucine changing into muco-peptone, and is therefore a sort of modified mucine, is the so-called colloid substance. This colloid degeneration is therefore nothing else than a mucous metamorphosis. The mucine group consists, therefore, of:

1. *Substance of the colloid corpuscles.* Only soluble in diluted alcohol. Perfectly precipitated by acetic acid.

2. *Mucine.* Also soluble in alkaline earths, and becomes hydrated in water. Perfectly precipitated by acetic acid.

3. *Colloid substance.* Slightly soluble in cold, but more soluble in hot water. Becomes turbid on the addition of acetic acid, but does not form a perfect coagulum.

4. *Muco-peptone.* Very easily soluble in water. Not precipitated by acetic acid.

The other class is the albuminous. The albumen is found in colloid ovarian

cysts under two forms, as free albumen and as albuminate of soda. The former coagulates by simply boiling; the latter only on the addition of an acid. The former, the free albumen, is always changed in colloid tumors into albumino-peptone, while the albuminate of soda remains unaltered. This change takes place very gradually. First, the property of coagulating on being heated is lost—it becomes paralbumen. Then it loses by degrees the property of being precipitated by the mineral acids and becomes a metalbumen.

Paralbumen and metalbumen are, however, not fixed bodies, but their peculiarity consists in their gradual change from free albumen to peptone.

The albuminous group consists of:

1. Albumen (fibrine).
2. Paralbumen.
3. Metalbumen.
4. Albumino-peptone (fibro-peptone).

The peculiarities of the several component parts are the same as those of the components of the mucine class. They are distinguished from the mucine class by the fact that they contain sulphur, and by their being precipitated by tannin and the neutral metallic salts. Since albumen gradually changes into peptone, a process takes place exactly like that of digestion.

On boiling, the contents of the cysts will be found to vary according to the amount of free albumen present. The fluid is perfectly clear if all the free albumen remains unchanged, but on the addition of acid it always becomes turbid, inasmuch as it then invariably contains the albuminate of soda.

Usually the larger cystomata are adherent at some point with the neighboring organs. Inasmuch as the ovary is not covered with the pavement epithelium found upon the peritoneum, but has a cylindrical mucous epithelium, it has no tendency to unite with the peritoneum. Therefore the smaller cystomata, as a rule, and often also the larger ones, are found connected by a pedicle with the uterus, otherwise they remain perfectly free. Later on, after the mucous epithelium has been lost, other adhesions are formed, and ultimately the cyst may become extensively adherent to the serous surfaces of the adjacent organs. The cystomata are subject to various changes:

The papillary cystomata are particularly apt to give rise to *hemorrhage into the cyst*, on account of the great vascularity of the papillæ. The blood naturally becomes mixed with the contents of the cyst, thus changing their character. If the hemorrhage is very profuse, which is most apt to be the case when the pedicle becomes twisted on its own axis (vide below),

the cyst undergoes a sudden enlargement.¹ Inflammation of the cyst is not a very rare occurrence, and may lead to peritonitis or to suppuration of the cystoma. This inflammation may appear spontaneously, but, as a rule, it is of traumatic origin, its most frequent cause being puncture of the cyst. The puncture is seldom followed by inflammation directly as the result of the wound or of the hemorrhage, but is generally owing to the admission of air into the cyst. Suppuration of the walls follows, and the pressure in the suppurating cyst becomes so great that the latter ruptures and its contents escape, either externally into adjacent organs, or into the abdominal cavity. Death may supervene, however, before any rupture has taken place, from general peritonitis or from exhaustion.

But perforation of the cyst may be due to other causes than the formation of an abscess or gangrene.² For example, the cyst may sometimes be ruptured through mechanical violence, though also in consequence of the development of papillæ within the cystic walls. In consequence of the pressure to which the growths give rise the walls become thinned, and ulceration and perforation ensue, and the papillæ may then grow into the abdominal cavity. Klebs³ describes a preparation which represents the escape through the rectum of a mass of papillæ which had developed from the interior of a cystoma. If the normal contents of the cyst escape, or the papillary excrescence advances into the abdominal cavity, peritonitis may not occur, inasmuch as the peritoneum is only slightly irritated thereby. In a very peculiar case, which Spiegelberg has described, the wall of the cyst was perforated in about thirty places, without any satisfactory cause being ascertained.

In those cases of so-called tubo-ovarian cysts⁴ we must consider that the perforation of the cyst takes place into the tube

¹ *Parry*, Amer. Jour. Obstet., IV., p. 454.

² *Spiegelberg*, Archiv f. Gyn., B. 1, p. 60, and *Kroker*, Uber die Urs. der spont. Perfor. der Ovariencysten. Diss. Inaug. Breslau, 1869.

³ *Pathol. Anat.*, IV. Lieferung, pp. 795 and 806.

⁴ *Blasius*, De hydropse ovariorum profluente. Hal., 1834. *Richard*, Bull. gén. de thérap., February 28, 1857, and Mém. de la soc. de chir., 1853, III., p. 121. *Labbé*, Bull. de la soc. anat. de Paris, Mai, 1857. *Hennig*, Mon. f. Geb., B. 28, p. 128, and *Spencer Wells*, l. c., p. 35.

which is adjacent to it. This explanation seems to us to be better than the one given by Klob,¹ who considers that at the time of the rupture of a Graafian follicle the ovary is grasped at this point by the fimbriated extremity of the tube, and is not again released, so that the follicle and the tube discharge their secretion into one common cavity.

But there remains to be mentioned still another class of changes which are associated with the process of involution. These may consist of:

Fatty degeneration of the epithelium and connective tissue of the cystic wall, a change, however, which is almost always limited in its extent.

Atrophy of the Cysts.—Owing to the pressure exerted by the contents of the cyst, the adjoining cysts may become obliterated and the production of glandular follicles be arrested, and the result is simply one large cyst in which all further development has ceased.

Atrophy of the cyst may also result from a *twisting of the ovarian cyst*² on its own axis, as first described by Rokitansky.³ In this event, which has also been observed in healthy ovaries, the pedicle becomes twisted, which gives rise to a venous congestion, and which may lead to a hemorrhage into the cavity of the cyst. Death may result from the internal hemorrhage. Spencer Wells⁴ saw one case in which a fatal termination ensued, where the blood escaped through the tube and uterus. In other cases inflammation or gangrene of the cyst, with their sequelæ, may follow. Again, it may lead to obliteration of the cyst. The twisting sometimes results in a complete separation of the pedi-

¹ Pathol. Anat. der weibl. Sexualorg., p. 348.

² Hardy, Lancet, April 5, 1845. Van Buren, New York Jour. of Med., N. S., Vol. VI., p. 153, 1851. Wiltshire, Trans. of the Pathol. Soc. of London, Vol. XIX., p. 295. Spencer Wells, Lond. Obstet. Soc., XI., p. 254, and Diseases of the Ovaries, p. 83. Burnes, Trans. Lond. Obstet. Soc., Vol. XI., p. 201, and St. Thomas's Hosp. Reports, N. S., Vol. I., p. 355. Parry, Amer. Jour. Obstet., Vol. IV., p. 454. Tait, Edin. Med. Jour., Dec., 1869, 503. Peaslee, Amer. Jour. Obstet., Vol. VI., p. 276. Wagner, Monat. f. Geb., B. 32, p. 355. Atlee, Ovarian Tumors, pp. 188 and 191.

³ Wiener Allg. Med. Z., 1860, No. 2, etc., and Oesterr. J. f. prakt. Heilk., 1865, No. 7.

⁴ L. c., p. 232.

cle, so that the atrophied ovary is found somewhere in the abdominal cavity surrounded by false membranes. It may become so abundantly supplied with blood by the vessels which form in the adhesions as to begin to grow again.

The condition of the cystoma may become still more complicated through the occurrence of mixed tumors. The connective-tissue wall of the cyst may consist of embryonic connective tissue, mucous tissue—*cystoma myxomatousum*—or, a sarcomatous growth may proceed from the connective tissue, so that a malignant tumor, a *cystoma sarcomatousum* or *cysto-sarcoma*, is developed. A combination of the cystoma with cancer—*cystoma carcinomatousum*—may occur if the little glandular prolongations growing into the connective tissue become converted into nests of cancer cells.

Waldeyer describes an accumulation of gritty, calcareous deposit on the wall of the cyst, which he thought had been deposited in the glands (either in the epithelium or in the glandular secretion), before they became destroyed.

Symptoms.

The symptoms caused by the cyst are very variable, and for a long time often are of very slight moment. Oftentimes the tumor will become as large as or even larger than a child's head, before the patient, who has not even had a suspicion of its existence, accidentally discovers it, or before it begins to occasion some complaint.

Very small tumors, generally speaking, give rise to symptoms only when they have an inflammatory origin, or are complicated with some inflammatory process, and more especially is this noticeable if, at the same time, there is a prolapse of the swollen ovary. In these cases pains, similar to those which accompany perimetritis, are complained of, and a round tumor can be felt which is tolerably movable, unless bound down by adhesions. If there is no inflammation present, symptoms serious enough to attract the attention of the patient appear only very late in the course of the disease.

Sometimes, it is true, menstrual irregularities are noticed

before the cystic degeneration begins ; but this, however, is not the rule. More frequently menstrual disturbances appear during the progress of the disease, as, for instance, amenorrhœa in cases where both ovaries are affected, although even then the catamenia may remain regular, for even when both ovaries are diseased some of their normal structure may remain intact. Where only one ovary is affected, alterations both in the character and amount of the menstrual discharge are noticed, and the catamenia may be entirely suppressed, while in many cases menstruation is not at all affected.¹

Very frequently the first symptoms occur when the tumor is large enough to press on the rectum and bladder. Defecation is then interfered with mechanically, and consequently the fæces become firm and hard, and in their passage press upon the enlarged ovary, thus adding to the inflammation and enlargement. Moreover, the pressure and traction upon the bladder may give rise to vesical symptoms. Often, after a great desire to pass water has existed for some time, but has not been attended to, incontinence is suddenly developed. The vesical symptoms do not usually disappear again during the further course of the disease, though certain symptoms may change.

Furthermore, there is a feeling of weight in the pelvis, pain in the back and abdomen, although these are frequently first noticed when the patient, either accidentally or owing to a sudden retention of urine, first discovers the tumor. Afterwards symptoms are complained of which arise from pressure on the nerves and blood-vessels, as, for example, pain and lameness most frequently confined to one leg, and œdema usually of both lower extremities. The difficulty in defecation becomes, moreover, very troublesome.

All these symptoms usually improve during the further progress of the disease, when the tumor grows so large as to rise above the brim of the pelvis. The patient may then feel comparatively well. In those rare cases in which, chiefly owing to adhesions in Douglas's cul-de-sac, the tumor is retained in the pelvic cavity, grave symptoms of incarceration may appear.

¹ *Charles West, Lectures on Diseases of Women, 3d edit. London, 1864, p. 526.*

Stocks¹ reports a very peculiar case, in which an ovarian tumor, the size of an orange, was found in a prolapsed rectum as large as a cocoa-nut. It was removed, together with the end of the Fallopian tube, and the prolapse was relieved.

If the tumor continues to grow after having reached the false pelvis, symptoms of the most varying description soon appear: pressure on the nerves and blood-vessels, traction upon the bladder, elongation of the uterus, distention of the abdomen, rupture of the rete Malpighii, pressure on the bowels, crowding upwards of the diaphragm, and dyspnœa. Retention of urine, with subsequent dilatation, may result from pressure on the uterus, and albuminuria may follow, owing to the passive congestion induced in the abdominal cavity.

General symptoms appear still earlier, and among these a very great importance attaches to those connected with the intestinal canal. As a result partly of the constipation, and partly also of the reaction which the disease naturally produces on the general system, and owing to the pressure exerted by the tumor on the whole intestinal canal, more particularly in the last stages of the disease, symptoms of dyspepsia manifest themselves—constipation, loss of appetite, nausea, and vomiting.

The breasts often swell, the areolæ deepen in color, and a milky secretion is observed.

Extreme emaciation follows, owing to the impaired digestion. In cases of very large tumors which press the lower ribs and the ensiform cartilage of the sternum forward, the heart is displaced, the lungs compressed, and the condition of the patient becomes often truly pitiable, especially if the lower extremities become markedly œdematous. The formation of adhesions, in consequence of the peritoneal inflammation, renders the course of the disease a pretty painful one.

Where the tumor occurs only on one side, sterility is not a necessary consequence, although it may be occasioned by the pressure of the tumor on the uterus and Fallopian tube. In cases even of double disease, conception may occur, so long as either ovary retains any true ovarian tissue.

¹ Brit. Med. Journ., June 1, 1872.

The progress of the disease is often much slower, and it is probable, as we have said before, that many small congenital cysts never develop to such a degree as to allow of any increase in the size of the ovary being detected by palpation. In by far the larger number of cases, however, in which the cysts are so large as to give rise to unmistakable symptoms, they never cease growing, sometimes, it is true, very gradually, but in other cases very rapidly.



FIG. 109.
Large ovarian tumor (Bright).

The issue of the disease is therefore generally fatal. Death may result from a supervening peritonitis, which is apt to be the case when suppuration takes place within the cyst, but frequently it occurs in consequence of the steady growth of the tumor, which, pressing upon the lungs, causes an increasing dyspnœa, the result of pulmonary œdema, or in consequence of a dropsical effusion into the peritoneal, pleural, or pericardial cavities.

A spontaneous arrest of the growth is very rare in those cases in which the tumor has attained any considerable size, and is brought about for the most part by a retrograde metamorphosis in the walls of the cyst. The further growth may be prevented also through the tumor becoming encysted in an unyielding mass of exudation, although it is only exceptionally that the tumor is so completely and firmly invested as to bring about this result.

A spontaneous shrinking or complete disappearance of the tumor by a process of reabsorption has not been established, if we except those cases of shrinking after axial torsion; but, on the contrary, all the cases¹ which have been reported as instances of such reabsorption have not been thoroughly authenticated. Even after an axial torsion has taken place this termination is rare, the case more frequently terminating in inflammation and death.

Rupture of the cyst may occur from a great variety of causes. In very small cysts with quite thin walls it may occur spontaneously (Chrobak² reported a case in which fatal peritonitis occurred after the rupture of a cyst the size of a hazel-nut). More frequently it is met with in connection with suppuration and disintegration, while in rare instances a hemorrhage may so distend the cyst as to cause it to rupture.³ The rupture may be traumatic also, as in the case reported by McMillan,⁴ in which, according to the patient's story, the cyst was ruptured by her being run over by a heavy wagon, from the effects of which, however, she recovered perfectly.

The contents of the cyst may escape into,

1. *The abdominal cavity.* This may give rise to an acute fatal peritonitis; while in other cases peritonitis is absent, or only a chronic irritation of the peritoneum may be produced, causing thickening of the peritoneum and the exudation of a fibrinous deposit over its internal surface.

If the contents of the cyst are very thick, the escape of the fluid after the rupture is so gradual that even the patient herself is not conscious of the occurrence. In a case reported by Menzel,⁵ the rupture, which was followed by the gradual evacuation of the gelatinous substance, probably took place months before the patient died. This case furnishes a valuable diagnostic hint, since, in a microscopical examination of the contents of the

¹ *C. West*, loc. cit., p. 509. *Huss*, M. f. Geb., IX., p. 141, and *Baker Brown*, l. c., p. 33.

² *Wien. med. Pr.*, 1869, No. 14.

³ *Parry*, *Amer. Jour. Obst.*, IV., p. 454.

⁴ *Edinburgh Obst. Trans.*, 1870, p. 152.

⁵ *Wien. med. Wochenschr.*, 1873, No. 37.

abdominal cavity, migrating lymphoid cells were found, which were not present in the contents of the ovarian cysts.

As a rule, the opening in the cyst closes again, and the cyst refills. Ballard¹ reports a case in which a cyst, the size of a child's head, repeatedly ruptured and refilled at regular stated intervals, the contents slowly escaping into the abdominal cavity. Exceptionally it may happen that a cure is effected after a rupture or a simple puncture has been made, owing to the shrinking of the cyst. Out of seventy-one cases which Tilt collected, in which rupture took place, thirty were cured, nineteen were relieved, and twenty-one died. Bristowe² reports a case in which the aperture remained open, and the cyst continued to secrete, and the fluid constantly escaping into the abdominal cavity gave rise to ascites. Simpson³ even thought that in this way it was possible for the size of the cyst to remain stationary, since the peritoneum could absorb the fluid as fast as it was secreted in the cyst.⁴

2. *Into the intestines.* Blasius,⁵ Denman⁶ and Philippart⁷ have seen cases of this kind which recovered. Mme. Boivin⁸ found, in a post-mortem examination, an ovarian cyst which had perforated the rectum. The fluid was constantly discharged by the rectum, fecal masses were also found within the cyst, and the case had been considered one of chronic enteritis. A similar condition of things was found in the case reported by Cooper Rose.⁹

3. *Into the vagina.* Meissner¹⁰ reports a number of such cases.

4. *Into the bladder.*¹¹

¹ Boston Gynecolog. Jour., III., p. 277.

² Transac. Patholog. Soc., V., p. 226.

³ Diseases of Women, p. 404.

⁴ *Palm*, Würtemb. med. Correspondenzbl., 1871, No. 37. Twenty-seven cases of spontaneous rupture.

⁵ Klin. Z. f. Chi., B. 1, H. 2, p. 836.

⁶ Med. and Physical Jour., II., p. 20.

⁷ Presse med. Belg., 1871, No. 44.

⁸ Mal. de l'utérus, T. II., p. 537, Anm. 1.

⁹ Lond. Obst. Trans., IX., p. 44.

¹⁰ Frauenzimmerkrankh., B. 2, I., p. 318.

¹¹ *Cohen*, Berlin, klin. Wochenschr., 1869, No. 51.

5. *Externally through the abdominal wall*, and indeed with tolerable frequency through the umbilical¹ ring.

Diagnosis.

Many valuable differential diagnostic observations, illustrated by an unusually rich series of cases, can be found in the work by Atlee already alluded to.

In ordinary uncomplicated cases the diagnosis, as a rule, is attended with very little difficulty, although, under certain circumstances, it may become exceedingly difficult or it may even be impossible. The differential diagnosis between a cystic tumor and a solid ovarian tumor will be considered when we come to speak of the latter.

In describing the difficulties in the way of making the diagnosis, we shall divide the cysts according to their size, and shall first consider the smaller tumors, including those which do not exceed the size of a child's head.

Cysts of this class come under medical observation much less frequently than the larger ones, since they do not, as a rule, produce any very marked symptoms. The diagnosis here is not usually difficult. On one side or the other of the uterus, and not much more frequently behind than in front of it (now and then the womb is displaced directly to one side) a round, well-defined tumor is to be felt, which is not joined to the uterus directly, but is separated from it by a broad furrow or connected with it by means of a pedicle of varying length. The tumor feels less firm than most of the tumors which are found in this region, and is elastic, though on account of its small size it may present no distinct fluctuation. The tumor is not perfectly fixed, and yet, on the other hand, it is not freely movable in the pelvis.

As a rule the combined examination fully suffices to ascertain this condition of affairs; although in very difficult cases an examination with half the hand introduced into the rectum (the introduction of the whole hand is unnecessary) will give very valuable information.

The diagnosis is, as a rule, very easy, since these small tumors,

¹ *Meissner*, l. c., p. 635.

when free from complications, can scarcely be mistaken for anything else.

It is a difficult matter to avoid confounding them with *cysts of the broad ligament*, which resemble them very closely, though these are very rare; it is very seldom, however, that near these tumors we find a body at all resembling in consistency and shape the normal ovary. According to Atlee, the fact that the contents obtained by puncturing the cyst are perfectly clear (like pure water), and are free from albumen, points conclusively to its being a cyst of the broad ligament, as does also the fact that it entirely disappears after being punctured, which is due to the extreme thinness of its walls.

It is possible, moreover, to mistake the cyst for *tumors of the Fallopian tube*, among which tubal dropsy is the most common. If the secretion has collected at any one circumscribed spot in the Fallopian tube, it is very hard to make out the diagnosis, since the tumor has exactly the same appearance then as an ovarian cyst.¹ As a rule, however, the dropsical effusion includes a larger portion of the tube, and feels like the intestine, is elongated and becomes narrowed towards the uterus, or else a number of bead-like tumors are felt lying near each other and corresponding to the position of the tube. When the tubal dropsy has attained an unusual size it very closely resembles an ovarian cyst, since then it has a similarly rounded form. In a case reported by Peaslee¹ a tubal dropsy of the left side was twice punctured as an ovarian tumor, the contents weighing about eighteen pounds; at the autopsy a real ovarian cyst was found on the right side.

As regards *fibroids of the uterus*, we need here only consider those which are connected with the uterus by a pedicle. As a rule, these tumors are united closely with the body of the uterus, but they are sometimes freely movable, and may lie on either side, occupying a position either anterior or posterior to the uterus. In such cases they are recognized by their consistency, which especially in this variety of fibroid is not apt to be soft. The discovery of other uterine fibroids throws some

¹ New York Med. Jour., 1870, and Brit. and For. Med.-Chir. Review, July, 1871, p. 252.

light on the nature of the tumor in question, although their presence does not make the diagnosis perfectly certain. The detection of the so-called uterine souffle, since this is rarely heard in ovarian tumors, renders the case very doubtful. The subsequent progress of the case will serve to clear up the diagnosis, since these pedunculated subperitoneal fibroids, although they generally grow, yet they increase much more slowly than ovarian cysts.

Small ovarian cysts are not apt to be mistaken for *parametric exudations*. The latter will scarcely have the uniformly rounded shape of an ovarian tumor, and either extend further down into the vagina or lie higher up, on one side, in the iliac fossa, where they remain fixed; moreover, they never possess the mobility of an ovarian tumor. No regard can be paid to the degree of sensibility found in the tumor, since old exudations may lose their sensitiveness, while, on the other hand, an ovarian cyst may become tender.

There is greater liability of an *intraperitoneal exudation* being mistaken for an ovarian cyst. It is true, however, that the previous history of the patient will generally determine the point, yet even this is not absolutely decisive, since symptoms may occur in connection with an ovarian cyst exactly like those which accompany peritonitis, and the tumor, moreover, may be very sensitive. The exudations, however, do not show the circumscribed limits nor the globular form of the ovarian tumors, nor are they movable, and their consistency is very different; even though the exudation may feel soft and doughy, yet the cyst is firm, elastic and fluctuating. The future history will, however, establish the diagnosis, since the cyst will increase in size, while the exudation either becomes smaller or else enlarges, with fresh symptoms of an acute inflammatory process.

Small intestinal tumors, such as fecal accumulations, typho-enteritis, perityphlitis, cæcal cancer, etc., cannot easily give rise to a mistake in diagnosis, if a thorough examination is made, for they have a very different consistency, are situated higher up, and are not connected with the organs of generation. The previous history and the accompanying symptoms also furnish characteristic points of difference. Fecal tumors are at once

recognized by the fact that the imprint left by the finger remains, and the administration of a cathartic causes the tumor to disappear.

Far greater difficulties are encountered in those cases in which the ovarian cyst is *complicated with perimetritis*.

If there is considerable exudation, it may so completely envelop the normal or enlarged ovary as to prevent us from ascertaining anything with regard to the condition of the latter.

Very peculiar difficulties are met with in those cases in which the ovarian cyst is closely united by peritoneal adhesions with the uterus, or is firmly bound down in Douglas's cul-de sac. If it is firmly adherent to the uterus it may easily be mistaken for either a subperitoneal or an interstitial fibroid. In the latter case, however, an examination with the uterine sound will show that the cavity of the uterus is abnormal, while the different consistency will serve to distinguish the cyst which is united to the uterus from a subperitoneal fibroid, although even this test is not sure, since an ovarian cyst may become very firm to the touch when encased in inflammatory pseudo-membranes. Under these circumstances it may be impossible to make out the diagnosis, unless an exploratory puncture of the cyst be made first.

It is also very difficult to form an opinion in those cases in which a cyst, which has become firmly adherent in Douglas's cul-de-sac, has gone on developing, giving rise to symptoms of incarceration, and secondarily, to those of inflammation of the peritoneum.

The differential diagnosis may also present great difficulties, owing to the following conditions:

1. *Intraperitoneal exudation encysted in Douglas's cul-de-sac.* This may cause a perfectly rounded protrusion of the cul-de-sac below, while above it has a diffused border extending often laterally into the iliac fossæ. In cases where the ovarian tumor is embedded in a large mass of exudation, it may become so altered that it is impossible to say whether the firm retro-uterine tumor is composed only of peritoneal exudation, or whether this new formation surrounds an ovarian cyst.

2. *Retro-uterine hæmatocèle.* This has all the appearance of a large encysted mass of exudation in Douglas's cul-de-sac.

3. *Incarcerated uterine fibroids*, complicated with peritoneal inflammation. If the amount of exudation is so great as to mask the characteristic consistency of the fibroid or the ovarian cyst, it is impossible to make out the character of the tumor with certainty.

In all these conditions an exploratory puncture, while it cannot in any of these cases do much harm, will furnish a valuable method of settling the diagnosis, since we can thus ascertain whether the contents of the tumor possess the peculiar characteristic of an ovarian cyst, or whether they consist of a serous or purulent exudation, or of blood, or whether no fluid contents at all are present.

4. *Retroflexion of the gravid uterus*, with symptoms of incarceration. Owing to the great sensitiveness found in these cases, this condition can frequently be recognized only by a combined examination made after the patient has been placed under chloroform. In the case of an ovarian tumor, the body of the uterus has approximately its normal position, which is not the case where we have to deal with a retroflexed uterus.

Difficulties of another kind, but none the less perplexing, may occur after the tumor has acquired considerable size, and these difficulties, as a rule, are greater the larger the tumor becomes.

We are not now alluding to those cases which frequently enough lead to a false diagnosis, in which we have to deal with a so-called *pseudo-abdominal tumor*. This is due to a distention of the intestines with gas and fæces, or to an excessive deposit of fat in the omentum, over the intestines, or in the subperitoneal connective tissue, and may lead occasionally to an enormous abdominal distention, and produce the sensation of a diffuse tumor. This condition, together with the spasmodic contractions of certain of the abdominal muscles, which in cases of hysteria may simulate an abdominal tumor, may be best recognized by placing the patient under chloroform.

If palpation shows that there is fluid in the abdominal cavity, the chief question to be decided is, whether we are dealing with a simple case of fluid in the abdominal cavity, in other words, with ascites, or with a cyst that is, fluid enclosed within a sac.

The diagnosis is, as a rule, easy, and difficulties are only rarely met with.

A simple inspection of the abdomen shows an absence of that peculiar form which is so characteristic of ascites, and in which the abdomen is flat and bulges out on either side, while the tense cyst causes a prominence of the central portion of the abdomen.

Palpation frequently distinguishes the two conditions with certainty, inasmuch as one can feel the cyst, if it is distended, as a circumscribed tumor, with a well-marked sense of elasticity and fluctuation. If the patient's position be altered, the spot where the fluctuation is detected changes perceptibly in ascites, which is not the case with a cyst.

If the cyst has thin walls and is relaxed, and not perfectly distended, it is necessary to practise percussion, which, in case of ascites, gives on either side a dull sound, and a tympanitic resonance in front, owing to the fact that the intestines float on the surface of the fluid, while exactly the reverse is found in the case of large cysts. Moreover, the fluid of ascites changes its position with every change in the position of the patient, while this is not the case with the cyst, or it alters its position only slightly, and moves as a solid mass.

Thus the two conditions may usually be distinguished, yet, owing to various causes, serious mistakes may sometimes occur. Thus, for example, in ascites, if the patient lies with the upper part of the body very much raised, a dull sound may be heard on percussion over the symphysis pubis (sometimes as far as to the umbilicus), yet as soon as the patient assumes a horizontal position the same region will be found to be tympanitic. In well-marked cases of ascites, even the centre of the abdomen may give a dull sound on percussion, owing to the fact that an unusually short mesentery holds the intestines below the level of the fluid. These cases are, however, characterized by the fact that superficial percussion gives dulness, while on deep percussion the sound is tympanitic, since the water is then pressed away.

On the other hand, one may find in ascites an intestinal sound on percussion over the right side of the abdomen, if the cæcum and colon are greatly distended by gas, and exception-

ally, as once observed by Meadows,¹ this may be well marked on both sides, where the intestines are fastened down by adhesions. In very rare cases the cyst may give the peculiar percussion sounds of ascites, in case it communicates with the intestine and the intestinal gas has thus gained access to it, or where air has been admitted to it in consequence of a puncture.

The differential diagnosis may also be very difficult in case the walls of the cyst are uncommonly relaxed, as they are particularly apt to be after a puncture has been made. The fluid may then act exactly as if it was free in the abdominal cavity.

In every doubtful case, great reliance is to be placed on the previous history of the patient, since there must exist some plausible reason (tuberculosis or cancer of the peritoneum, heart disease, affections of the kidneys or of the liver) to account for the production of so marked an ascites. Yet cirrhosis of the liver, which may produce an extreme degree of ascites, is sometimes very difficult to diagnosticate. Heart disease and affections of the kidneys are accompanied not only by ascites, but by œdema elsewhere; yet we have seen a simple ascites which was mistaken for an ovarian cyst, and which occurred in connection with heart disease without any œdema of the lower extremities accompanying it.

We shall come to speak later of the marks of distinction which may be derived from an examination of the fluid obtained by an exploratory puncture.

If through the diagnostic points already given, it has been ascertained that the collection of fluid in the abdomen is encysted, the presumption is in favor of its being an ovarian cyst, since other forms of encysted fluid are much less common.

It is possible to confound it with one of the following conditions:—

1. With *encysted peritoneal fluid*. To be sure, such small amounts of fluid exudation as are often found encysted in connection with peritonitis, will not be apt to occasion any mistake; but in tuberculosis and cancer of the omentum and of the peritoneum, large tumors may develop which present a certain similarity to ovarian cysts.

¹ Med. Times and Gaz., March 4, 1871, p. 245.

In connection with the differential diagnosis, the previous history and the patient's general condition must be taken into consideration, and in the case of tuberculosis, the evidence of the disease in other organs, together with the fever. Moreover, the sensitiveness is an important point, although this may be exceedingly slight or altogether wanting.

Furthermore, the encysted exudations always have more diffused boundaries than ovarian tumors enclosed within cystic walls, and therefore they cannot be so well investigated by palpation. Moreover, they often lie flat against the anterior abdominal wall, so that in percussion the sound of the intestines lying beneath is transmitted through them. In cancer of the peritoneum or omentum, the cancerous nodules may sometimes be felt in the exudation surrounding them, yet these very cases bear an extraordinary resemblance to irregular, multilocular ovarian cysts which lie in a copious ascites. Later on we shall again allude to this class of cases.

Three cases reported by Routh,¹ in which a cancer with encysted ascites was mistaken for an ovarian tumor, should teach us the importance, in all such doubtful cases, of first making an exploratory puncture. A similar case is also reported by Lücke and Klebs.²

2. *With a distended bladder*, which may be recognized from its peculiar, bulging form, and is detected at once by the introduction of a catheter.

3. *With other abdominal cysts, especially with*

Hydronephrosis.—The differential diagnosis of this affection from an ovarian cyst is extremely difficult, since, when it becomes very large, it presents on an external examination precisely the same features. Hence the number of instances on record where this error in diagnosis has been committed is very large.³

¹ *Obstet. Jour. Great Brit.*, April, 1874, p. 13.

² *Virchow's Archiv*, XLI., p. 8.

³ *Johnson*, *Monthly Med. Chir. Jour.*, 1816. *Rayer*, *Maladies des reins*. Paris, 1841, III., p. 487. *Kirsten*, *Monat. f. Geb.*, 1863. *Suppl. H. zu B.* 21, p. 125. *Dumreicher*, *Woch. d. Zeitschr. d. Ges. d. Wiener Aerzte*, 1864, p. 104. *Cooper Rosa*, *Med. Times*, May, 1868, p. 591; *Lancet*, May 23, 1868. *Martini*, *Deutsche Klinik*, 1868, No. 1.

The following marks of distinction between the two conditions may be mentioned :

While hydronephrosis, like all retro-peritoneal tumors, has the intestines in front of it, an ovarian cyst pushes them to one side. This undoubtedly is not to be relied on in all cases, since a very large hydronephrotic cyst may sometimes drag the intestines to one side, and an ovarian tumor may sometimes¹ have a coil of the intestines in front of it. Moreover, it may be difficult to ascertain for a certainty that the intestine lies in front of the tumor, if the intestine has been so compressed as to drive out the air, and the percussion gives no tympanitic sound. According to Spencer Wells, if it is rolled underneath the finger, the intestinal contractions can be felt or borborygmi heard, or it may be inflated with air per rectum. Simon recommends the introduction of long elastic tubes into the large intestine, which will lie behind the tumor in case it is ovarian, but will be in front if the tumor is a hydronephrosis.

The relations of the large intestine to large tumors which spring from the right kidney are generally such that the colon ascendens lies along its inner border, while the tumors of the left kidney are crossed transversely by the colon descendens.

On making a vaginal examination, the ovarian tumor, as a rule, lies close to the superior strait of the pelvis, although it may be situated very high up if it has become unusually large.

The presence of pus, albumen, or blood in the urine, generally denotes the presence of hydronephrosis.

An examination per rectum, with half the hand introduced, or with the whole hand if necessary, when the size of the tumor will admit of such an examination, will show whether the growth is connected with, or is independent of, the organs of generation.

In many cases even an exploratory puncture will not solve the doubt, since, in old hydronephrotic cysts, the constituents of the urine may be wanting.

The diagnosis of hydronephrosis stands in a close relation to

Krause-Baum, Langenbeck's Archiv, B. 7, p. 219. *Heller*, Deutsches Archiv f. klin. Med., V., p. 267. *Wheeler*, Bost. Gyn. Jour., Vol V., p. 199 and p. 264. *Schetchlig*, Arch. f. Gyn., B. I., p. 416. *Spencer Wells*, l. c., p. 208.

¹ *Schetchlig*, Arch. f. Gyn., I., p. 426.

that of renal echinococci,¹ and many points of resemblance are presented also between it and that of echinococci of the subperitoneal connective tissue.² The exploratory puncture even, which revealed the contents of the sac of the echinococci, was deceptive in Spiegelberg's case, since the trocar only penetrated an abscess which had formed between the mother-cyst and the connective-tissue capsule.

Moreover, other abdominal cysts, such as those described by Montet³ under the name of *cystes hydatiques de la paroi abdominale antérieure*, and those which West⁴ has referred to as occurring between the folds of the omentum, are exceedingly apt to give rise to mistakes in diagnosis, since these very rare cases do not readily suggest themselves.

4. With *soft interstitial fibroids*, or, still more, with *fibro-cystic tumors* of the uterus or broad ligament.⁵

All tumors arising from the uterus lie in a closer relation to it than the ovarian cysts, and, as a rule, are connected with it in the form of sessile growths. If the uterus lies in front of the tumor, their relations to each other can usually be easily determined; yet a large ovarian tumor may be so firmly pressed against the uterus that they seem to form one continuous mass, or they may be united together secondarily by a broad adhesion. In these cases, however, the uterus undergoes comparatively little change. In ovarian disease the uterus is rarely dragged upwards, and its cavity lengthened, as is very commonly observed in case of uterine tumors. It is more difficult to understand the relation of the uterus to the tumor, when the uterus lies behind the latter, and an examination per rectum with the hand half introduced will not always decide the point. Yet, even in these cases, the marked displacement of the uterus upwards and backwards, as well as the absence of all mobility, renders its uterine origin very probable. Palpation is also

¹ Spiegelberg, Arch. f. Gyn., B. 1, p. 146.

² Spiegelberg, Arch. f. Gyn., B. III., p. 272, and Spencer Wells, loc. cit., p. 151.

³ Gaz. hebdom., 3 Mai, 1872, No. 18.

⁴ Loc. cit.

⁵ Concerning the differential diagnosis between these two conditions, see Spencer Wells, Med. Chir. Transac., IV., and l. c., p 183. Kidd, Dublin Jour. Med. Sci., Jan., 1872, p. 39. Péan, see Péan and Urdy, hystérotomie. Paris, 1873, p. 117.

extremely useful in these cases. The uterine fibroids feel, as a rule, harder, or at least the firm and solid portions will be found to predominate over the fluctuating parts. Moreover, the firm portions of an ovarian cyst are almost invariably found towards the pelvis. An exploratory puncture of the fibro-cystic tumor either yields nothing, or only a small amount of clear or bloody serum, since the fluid is contained, as a rule, only in the small interstices of the tissue. It is only rarely that a large amount of yellow fluid is obtained. This fluid, according to Atlee,¹ possesses the peculiar characteristic of coagulating like blood. The specific gravity is about 1.020.

The previous history is also important, inasmuch as fibro-cystic tumors are particularly apt to give rise to uterine hemorrhages.²

5. With a uterus enlarged through distention of its cavity, hence with *pregnancy*, with *hæmatometra*, and with *submucous fibroids* or *interstitial fibroids*, if they are inclined to project into the cavity. In these cases there must be some evidence to show that the uterus itself is enlarged, just as in cases of ovarian cysts care must be taken to ascertain that the normal or slightly altered uterus is lying beside the tumor; this is not always easy to do, if the uterus lies behind the tumor. Hæmatometra is most easily recognized by the previous history, as well as by certain other methods. In pregnancy we have the foetal heart and movements, and the foetus itself may be felt through the abdominal walls; the condition of the vagina and vaginal portion of the cervix is also characteristic, and, besides, the uterine souffle is heard very rarely in ovarian tumors. In case of a blighted ovum, or of a putrid child, these signs are wanting, so that all that can be ascertained is that the tumor is the enlarged uterus itself. Fibroids projecting into the uterine cavity are always productive

¹ L. c., pp. 154, 262, and 464.

² With regard to the cases recorded of errors committed in the differential diagnosis between these two conditions, see *Kumar*, Wiener med. Presse, 1867, p. 703. *Stilling*, Deutsche Klinik, 1868, p. 89. *Germann* and *Simon*, s. *Grenser*, Ovariectomie, p. 103. *Lee*, New York Med. Record, Jan., 1870, p. 495. *Tappehorn*, Deutsche Klinik, 1871, 30. *Puckard*, Amer. Jour. Med. Sci., Oct., 1871, p. 433. *Roberts*, Lancet, Nov. 25, 1871. *Landi*, Lo sperimentale, 1871, p. 21. *Beatty*, Brit. Med. Jour., Nov. 4, 1871, p. 517. *McGuire*, Med. Times, April 1, 1872.

of hemorrhages, and the submucous tumors are characterized at least by their closing up the cervix. The differential diagnosis from interstitial fibroids, which grow more towards the external surface, has already been spoken of in the previous paragraph.

6. With *extra-uterine pregnancy*. Here also the discovery of the foetal heart, and palpation of the foetus itself are of decided importance; but, if the child is dead and the membranes distended, the diagnosis may be exceedingly difficult, especially if the previous history is unknown. We shall again refer to the similarity between extra-uterine pregnancy, and an ovarian tumor complicated with ascites.

7. With *tumors of the liver*. Displacements of the liver, and particularly those cases in which the liver is twisted on its transverse axis and lies low down, or the so-called wandering liver,¹ will not be apt to occasion any mistake, since it is evident that the tumor proceeds from above, and is wholly independent of the generative organs.

Among the tumors proper of the liver those caused by echinococci are the most important, for they may become so large as to rest on the superior strait of the pelvis. In these cases, however, the previous history will show that the tumor grew from above downwards, and an examination proves clearly that it is directly connected with the liver, and moves with it in the movements of respiration. The combined exploration, or an examination per rectum, will show that the generative organs are normal.

Cancer of the liver will not easily occasion any error; *cysts of the gall-bladder*, too, rarely attain so great a size that any such difficulty in the diagnosis is likely to arise as happened in the case reported by Simpson.²

8. With *tumors of the spleen*. These are always so characteristic that they cannot be mistaken if properly examined. The enlarged spleen feels like a smooth, very firm tumor, lying decidedly to the left. When the patient lies on her back, it may, to be sure, cross the median line to a considerable extent,

¹ *Meissner*, Schmidt's Jahrb., CXLI., p. 107 and *Winkler*, Archiv f. Gyn., IV., p. 145.

² *Diseases of Women*. Edin., 1872, p. 432.

yet when lying on her left side it is situated wholly on the left. Moreover, the tumor is bounded on the right by a sharp border, which passes in a tolerably straight line, though sometimes broken by a well-marked depression (the hylus) from above downwards and to the right. This border feels sharp, and inclines steeply downwards posteriorly. In an ovarian tumor no such boundary is felt towards the right. The tumor is movable, and, as I have myself observed, its lower rounded extremity may force its way downwards into the true pelvis.¹

9. With a *mobile kidney*.² This may give rise to a mistake in case it is very large, and so far displaced as to reach the anterior abdominal wall, lying across the superior pelvic strait, as observed by me in one case which was sent to me with a view to ovariectomy. With regard to the differential diagnosis, the peculiar kidney-shaped form of the tumor is of importance by itself, aside from the fact (ascertained by conjoined exploration) that it is disconnected with the generative organs. Moreover, the kidney is very movable, and can without difficulty be replaced in its normal position at the right of the vertebral column (the left kidney is only very rarely movable). Besides, the fact that the region usually occupied by the kidney is empty (a point which can sometimes be ascertained by palpation through the abdominal walls, and by percussion in the lumbar region) will assist the diagnosis materially.

10. With *lipoma* or *fibroid of the mesentery or peritoneum*. Tumors of this class may greatly resemble ovarian cysts when they attain any very considerable size, which they rarely do, to be sure. Bailey³ saw at an autopsy two enormous lipomata, one of which weighed fully fifteen, the other twenty-two pounds. Spencer Wells⁴ also saw a similar case. Cooper Forster⁵ has reported a case where the tumor weighed fifty-five pounds.

¹ For errors in diagnosis, see *Haber*, *Klin. d. Geb.*, B. II., S. 221; and *Shillineau*, *Boston Gyn. Journ.*, IV., p. 273.

² *Fénel*, *Archives de méd.*, 1859, B. II., pp. 158 and 391. *Wied*, *loc. cit.*, p. 542. *Reiser*, *Pathol. u. Ther. d. beweglichen Niere*, Erlangen, 1886. *Jap.*, *Medical Times*, 1872, II., p. 1160. *Hewitt*, *Brit. and For. Med.-Chir. Review*, Oct., 1873, p. 321.

³ *Amer. Jour. Obst.*, VI., p. 38.

⁴ *Loc. cit.*, p. 146.

⁵ *Pathol. Trans.*, XIX.

Finally, we wish expressly to call attention to the fact that when the abdominal tumor has reached an extraordinary size there is no possible way, aside from the explorative puncture, of making a certain diagnosis. The tumor, no matter where it originates, borders so closely on the other organs which come into account, and is so intimately connected with them, and covers such a large extent, that even at the autopsy, as I have seen in a case of ovarian cystoma, it may be difficult to say whether the tumor springs from the ovary or from the liver.

Especial difficulties may arise in cases in which we have to deal with complications. In this connection we have especially to consider—

1. *Ovarian cystoma and ascites.* A small amount of ascitic fluid is usually found in connection with ovarian cystomata. This is generally overlooked, and cannot in any way affect the diagnosis. It is a very different thing, however, when the ascites is well marked. If the ovarian tumor is correspondingly small, it may altogether escape detection; but if it is large, and shows on its surface the numerous cystic nodular protuberances, a very peculiar condition of things is discovered by palpation. Nodular tumors can be felt in the abdominal fluid, which are easily displaced, and are suggestive of the extremities of the foetus in the liquor amnii or of the cancer nodules in an encysted ascites. The methods of discriminating between these conditions have already been described.

2. *Ovarian cystoma and pregnancy.* In the second half of pregnancy the positive signs of the condition are so clear that the diagnosis presents but little difficulty; yet in the first half of pregnancy the gravid uterus, lying behind the ovarian tumor, may very easily be overlooked; or, if the second tumor be discovered, it may be taken for the other diseased ovary. Even Spencer Wells punctured the gravid uterus in performing the operation of ovariectomy, thinking it was the other enlarged ovary. It is always important to the diagnosis that the possibility of this complication be borne in mind.

Finally, we have to consider the question, how are we to know which ovary is diseased, or whether both are affected?

In large tumors this may occasion considerable difficulty, but

yet it is not of much importance, since for the most part it is a matter of indifference which side is diseased, and we must always be prepared for the presence of the disease on both sides.

In determining *to which side the affected ovary belongs*, it is important to ascertain what the state of the intestines is, for, as a rule, they are crowded backwards more on the diseased side, so that when the patient is lying quietly in the recumbent posture the intestinal percussion sounds are heard over a greater extent on the side of the healthy ovary. The displacement of the uterus is also important, since it may be assumed, as a rule, that if the uterus is pressed to one side, it is the ovary of the other side which is affected. But this, however, is not always a necessary conclusion. Martin¹ has reported a case in which the tumor, though evidently situated on the left side, yet belonged to the greatly displaced right ovary.

A more important question to determine is, *whether the disease is double or not*. It is not always possible to answer this question, in case the tumor is of considerable size, for the internal examination will not generally decide it, and the external examination may be very deceptive. It is possible, for example, that an apparently single tumor may conceal the other diseased ovary behind it; while occasionally, on the other hand, in the case of a single multilocular cystoma, the impression may be produced of two entirely independent tumors. Hence we should never diagnosticate double disease unless two tumors are felt, with an intervening space between them.

Less difficulty will be experienced in deciding the question whether we are dealing with a *unilocular* or with a *compound cyst*. In the former case the tumor is not so large, inasmuch as it consists of a retained cyst of the Graafian follicle, and the constitutional symptoms are less than in the case of a cystoma. Moreover, it is perfectly round in shape, or somewhat oval, and fluctuation is very distinct throughout the whole tumor. This last peculiarity may also be observed in multilocular cysts with very thin partition walls; still, even in this case the tumor does not have the same rounded form. Very large cysts are only

¹ Boston Gyn. Jour., V., p. 268.

rarely unilocular, although later on, in the case of large cystomata, the very small accessory cysts may be entirely obscured by the main cyst.

In all cases in which the diagnosis of an abdominal tumor is not perfectly simple, it is well, before any operation, to puncture the cyst and examine its contents.¹ This may be done in various ways :

1. By the simple *explorative puncture*. It is necessary to combine suction with the puncture, since, as frequently happens, the thick, viscid contents of the cyst will not flow through an ordinary trocar, and too little of the fluid is obtained by means of the common exploring needle.

The suction may be performed either by means of an aspirator, as that of Dieulafoy, for instance, or by a simple hypodermic syringe, as Walker² recommends. The needle of the syringe is plunged into the tumor, the handle is then drawn backwards, and the fluid is sucked into the tube of the syringe.

The simple puncture of the cyst is the least dangerous method, since the opening made by the needle is so small that, as a rule, none of the cystic contents escape into the abdominal cavity after the needle is withdrawn. Yet in one case, where the cyst was greatly distended, Peaslee³ saw this happen ; but this accident is undoubtedly a very exceptional one.

2. *By paracentesis*. A large trocar is here used, through which even a colloid fluid can flow, and the cyst is punctured in the manner which we shall hereafter describe when we come to speak of the treatment.

The advantage of this method is, that a very large amount of fluid is obtained, which may then be examined in any way desired. Furthermore, great advantage may often be derived, after the cyst has been thoroughly emptied, by again making the combined examination. If the tumor is found to have completely disappeared, we may know that it is a simple case of ascites, since it is always possible to feel the remains of a cyst.

¹ Spiegelberg, Mon. f. Geb., XXXIV., p. 384 ; Arch. f. Gyn., III., p. 271 ; and Volkmann's Samml. klin. Vortr., No. 55, p. 435. Waldeyer, Arch. f. Gyn., I., p. 266.

² Thomas, Diseases of Women, 3d ed., p. 663.

³ Amer. Jour. Obstet., VI., p. 103.

It is only in the case of a simple dropsy of the Graafian follicle (and also in cysts of the broad ligament) that the walls of the sac may be so thin as to prevent one from feeling any trace of the cyst after it has been completely emptied.

3. By an *exploratory puncture of the abdomen, by means of a lancet*, which is found especially serviceable when it is desired to determine whether a large amount of ascitic fluid is present or not. The lancet is passed in so slowly and cautiously through the linea alba that only the abdominal walls are punctured and not the wall of the cyst. So soon as any fluid is observed escaping near the lancet, a silver canula is at once introduced through the opening and the fluid is evacuated. The examination of this fluid, as well as the bimanual exploration after the cyst has been emptied, will afford very valuable information.

The fluid obtained by these various methods should be examined *chemically* and *microscopically*, and the question of its origin can then usually be determined with certainty.

The fluid which comes from a cystoma has, as a rule, a very characteristic appearance. The tenacious character of the dark colloid fluid, with its high specific gravity (1.018–1.024), is only met with in ovarian cystomata. In the chemical examination a very large amount of albumen is found, as well as paralbumen and metalbumen, which are recognized in the manner described by Waldeyer.¹

In the sediment, which is usually very abundant (it is only in dropsy of the Graafian follicle that the amount is small), cylindrical epithelium is found under the microscope, either in a well-preserved condition or undergoing the process of colloid or fatty degeneration and disintegration.

Ascitic fluid has a lower specific gravity (about 1.010–1.015) and contains a less amount of albumen. A very important guide to the diagnosis is the fact that, by allowing the fluid simply to stand exposed to the air for from twelve to forty-eight hours, a gelatinous coagulum is deposited, that is, the fluid shows a tendency to spontaneous coagulation, for these peculiarities are not observed in the fluid obtained from cysts, not

¹ Arch. f. Gyn., I., p. 268.

even when considerable hemorrhage has taken place within the cavity of the cyst. Paralbumen and metalbumen, it appears, do not occur in the ascitic fluid.

This very characteristic mark of distinction pertains doubtless only to true ascites; at least in the second of the cases which I have reported the examination of the exudation in chronic peritonitis showed a composition which strikingly resembled that of the cystic fluid. The exudation obtained by the puncture contained numerous fibrinous coagula, and, according to the examination of Gorup, its specific gravity was 1.023. Of the albuminous elements it contained some albuminate of soda, a little paralbumen, and considerable serum-albumen. The exudation obtained by ovariectomy had, according to the examination of Hilger, a specific gravity of 1.038, and contained, besides traces of mucine, a large amount of paralbumen and a little serum-albumen.

Under the microscope amœboid cells are found, but never cylindrical epithelium.

In *hydronephrosis* the characteristic condition of the urine is a noticeable feature, yet in old chronic cases this may be wanting. With a specific gravity of 1.018, Schetelig¹ found neither urea nor creatinine, but only a small amount of serum-albumen and mucine, and a large amount of paralbumen.

The contents of an echinococcus sac are recognized at once by their lower specific gravity and the absence of albumen, or its presence only in very small amount. By chemical examination grape-sugar and inosite are found, while under the microscope scolices, or, at any rate, the hooks, are seen, and sometimes even pieces of the peculiar vesical membrane.

In fibro-cystoids, when any fluid at all is obtained by the puncture, according to Atlee, it is yellow and has a specific gravity of 1.020, and almost immediately coagulates on exposure to the air, in the same way as blood.

According to the same author, the fluid derived from the cysts of the broad ligament is exceedingly clear, with a specific gravity varying from 1.004 to 1.009. Besides paralbumen, no albumen is found generally, while the microscope shows at the most only a few epithelial cells.

Incision for the purpose of diagnosis.—*Exploratory incision.*

¹ Archiv f. Gyn., I., p. 416.

In those cases in which the diagnosis remains doubtful, but in which the symptoms render the operation of ovariectomy desirable, it is well to begin the operation with an exploratory incision.

To this end, all the necessary preparations are made for an ovariectomy, and the operation is begun with a small incision, a few inches in length, which opens the abdominal cavity, whereupon the finger is introduced and the diagnosis is established. If, however, this method does not succeed, the cystic contents are to be evacuated by means of a trocar, and another examination is made with the fingers introduced inside the wound in such a way as to feel the uterus, ovaries, and the origin of the tumor.

If it is ascertained that the removal of the tumor is impracticable, the abdominal wound is closed again, and the chances of recovery after the procedure are not much more unfavorable than after the operation of paracentesis. In case the tumor is to be removed, however, we proceed at once to the operation of ovariectomy.

Prognosis.

While it is a fact that many cysts never advance beyond an incipient stage of development, yet it is certain that when a cyst has once attained a sufficient size to lead the patient to seek medical aid, it almost always continues to increase, and finally imperils the life of the patient in the various ways we have described.

Ovarian cysts, therefore, must be considered as very dangerous lesions, which, as a rule, tend to a fatal termination. A spontaneous cure is very rare. There is a very great difference, however, in the rapidity of the course in different cases.

Treatment.

We can scarcely do anything in the way of prophylactic treatment, since we know nothing of the causes which lead to ovarian cystomata, and, moreover, the retention-cyst of the Graafian follicle occurs so rarely that it is scarcely worth while to concern ourselves about any prophylactic treatment.

The larger ovarian cysts can neither be made to disappear, nor can they be arrested in their growth either by medical or by dietetic treatment, although it may be possible in many cases to somewhat retard the development.

Scarcely any reliance is to be placed upon so-called resolvent remedies, such as iodine, bromine, mercury, and their compounds. The influence of these remedies upon the tumor has never been proven, and hence we should avoid the risk of undermining the constitution that might be incurred by giving large doses.

Drastics, diuretics, and diaphoretics cannot prevent the growth, and the drastic remedies are directly contra-indicated, since they disturb the digestion.

A judicious diet, however, is of no little importance, since the rapid or slow growth of the tumor is, at least partly, dependent on the general condition of the patient. Through frequent sexual indulgence, irritating diet, and stimulating drinks—through the presence of a simultaneous inflammatory condition of the uterus and its neighboring organs, the course of the disease will be more rapid than if all these evil influences were absent, and instead, nourishing but not stimulating diet were allowed, and the patient were required to lead a reasonable and simple mode of life. Moreover, complicating inflammations of the generative organs must be treated antiphlogistically, and in fact it is well, in order to avoid the injurious influence of the menstrual hyperæmia, to scarify the vaginal portion of the cervix just before and after the menstrual periods. In this way we may at least hope to retard the growth somewhat, and to render the course of the disease a more chronic one.

It is further important as far as possible to relieve the pain which is present. For this purpose one must see especially that all unnecessary increase of the other contents of the abdomen is prevented, by taking care that the urine is voided regularly and not at too long intervals, and by obviating over-distention of the intestines, through regulating the digestion and the action of the bowels.

If the tumor, while yet in the true pelvis, produces very severe symptoms of pressure, these can be alleviated by pushing

the tumor above the superior strait of the pelvis, provided there are no adhesions present.

The most effective palliative effect will be obtained through *evacuation of the cyst*.

We come in this connection to consider the *operative treatment*,¹ which may be resorted to either for the sake of the palliative effect or with a view to a radical cure. We shall first speak of the operative measures for the treatment of ovarian tumors aside from ovariectomy, first describing the technical points of the operations, and then comparing the value and indications of each as compared with others.

1. *Puncture*.—For the purpose of puncturing the ovarian cyst a trocar must be used which will not allow the air to enter, since, if this happens (as might easily occur towards the end of the operation were the ordinary trocar used), suppuration of the cyst ensues. Thompson's trocar (represented in Fig. 110) is especially designed to avoid this.²

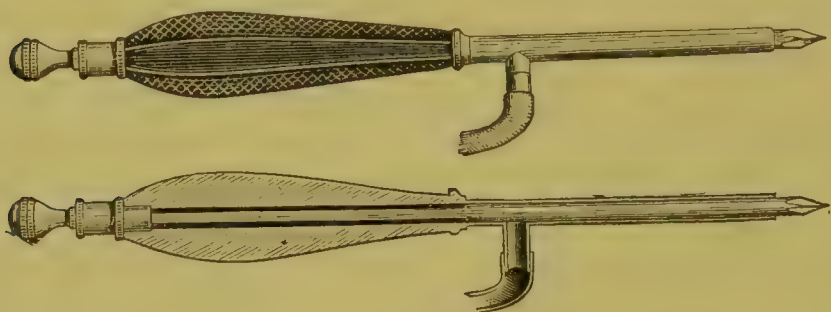


FIG. 110.
Thompson's trocar.

Puncture through the abdominal wall is performed, after the bladder has been emptied with the catheter, while the patient is in bed and lying somewhat on one side. The operation performed in the sitting posture has no advantages and should be avoided, inasmuch as syncope is then more liable to occur than when the patient is lying down.

The linea alba should, as a rule, be selected as the place for

¹ *Fock*, Mon. f. Geb., VII., p. 332.

² *Med. Times and Gaz.*, March 27, 1858.

puncturing, since this is the thinnest spot and hemorrhage is more surely avoided. If the fluctuation at the linea alba is indistinct, another spot is chosen where it is well marked. All profuse hemorrhage may be avoided, for it is always possible to see any large veins or to feel the pulsation of arteries of any considerable size. After carefully examining by percussion, to see that no portion of the intestines is lying behind the abdominal wall, the trocar is plunged forcibly into the tumor. Since the point of the trocar meets with the greatest resistance in penetrating the skin, it is advisable to make a slight incision first with the lancet before puncturing.

After the stylet has been withdrawn the contents of the cyst flow through the rubber tube of Thompson's trocar into a vessel ready prepared for it. When the cyst has become nearly empty the end of the pipe must lie below the surface of the fluid, lest, during a deep expiration, the air should enter the cavity of the cyst. In order to empty the cyst as completely as possible, the abdomen must be compressed at the end, and the trocar is withdrawn as soon as the flowing has entirely ceased. A piece of sticking-plaster, in the shape of a Maltese cross, is applied over the wound in the skin.

The *puncture through the vagina* is an operation rarely resorted to, and only in those cases where the tumor is best reached in this situation, as, for instance, where a small cyst is bound down firmly in the cul-de-sac of Douglas. The trocar is thrust into the most dependent portion of the tumor, and the fluid allowed to drain off.

Puncture by the rectum has very properly been given up, since it has no advantages to offer and is liable to be attended with the escape of intestinal gases into the tumor after it is emptied.

Puncture, with subsequent drainage, may also be performed; either through the abdomen or by way of the vagina. The mode of operation is the same as in the case of a simple puncture, or a common trocar may be used, and after the cyst has been emptied an elastic catheter or a gutta-percha drainage tube is introduced through the canula and allowed to remain in. By this means there is a constant escape of secretion, which after-

wards collects, and, in case the contents decompose, the cyst can be washed out.

Under the name of *ovariocentesis vaginalis* Noeggerath¹ has recommended a somewhat complicated method of procedure. After first introducing a Sims's speculum he cuts through the vagina and peritoneum until he comes down upon the cyst, which then protrudes through the wound. This he punctures, and after widening the opening made by the puncture he sews the edges of the opening in the vagina and of that in the cyst together.

The *puncture* may be combined with *the subsequent injection of iodine* or some other irritating fluid, with a view to causing inflammation and obliteration by adhesions of the cyst. For this procedure the puncture is first made in the usual manner, and then the fluid to be injected is thrown into the interior of the cyst, either directly through the canula or by means of an elastic catheter which has been introduced through the canula. The fluid should be allowed to remain within the cyst from five to ten minutes, and in the mean time we should endeavor, by cautiously kneading the abdomen and by change of position, to bring the fluid in contact with every part of the walls of the cyst. The fluid may be allowed to escape, or it may be drawn off, as far as possible, by means of an aspirator. Finally, the canula is to be withdrawn; although some authorities advise leaving it in, so as to repeat the injection.

For an injection we may use the various preparations of iodine, which are recommended also for this purpose in other cysts. Boinet, who first employed this method of treatment to any great extent,² was in the habit of injecting a mixture containing three fluid ounces each of tincture of iodine and water, and one drachm of the iodide of potassium.

Inasmuch as experience has taught that after a cyst has ruptured, and its contents have escaped into the abdominal cavity, a radical cure may follow, physicians have endeavored to imitate this result by making a *permanent opening between the cyst and the abdominal cavity*.

¹ Amer. Jour. Obstet., II., p. 1.

² Bull. de Thérap., Août, 1852, and Gaz. Hebdom., 1856, No. 47.

Simpson punctured the cyst with a four-sided trocar, in the hope that the opening produced in this way would not close up again. Baker-Brown operated more boldly, in making an incision through the abdomen and puncturing the cyst, which was then drawn forward to the opening and a piece excised, after which the cyst was replaced within the abdominal cavity.

Of all these methods the simple puncture is the least dangerous, especially if care is taken to prevent the admission of air. To be sure, this usually affords only a temporary relief, for, as a rule, the emptied cyst fills again, often with great rapidity, though in other cases more slowly. This repeated filling up of the cyst is very wearing on the patient's strength, since the albuminous components of the cystic contents are abstracted from the system at large, so that if the cyst fills quickly, and the punctures have to be repeated at short intervals, the patient rapidly sinks. These unfavorable results of the simple puncture must always be borne in mind, although it often becomes necessary as a palliative measure, aside from its value as an aid to the diagnosis, and as a means of deciding with regard to the propriety of performing ovariectomy. One need never hesitate to perform it, since, according to the experience of Spencer Wells, the previous puncture does not in any way lessen the chances of success of the ovariectomy, and since it is rarely followed by death; moreover, those cases in which a fatal result has been observed are counterbalanced by those in which a radical cure has followed. A shrivelling of the cyst may be regarded as most probable in the case of a retention-cyst of the Graafian follicles.

Thoman,¹ Southam,² Spencer Wells,³ and Chrobak⁴ have reported cases of cure following a single puncture. Telford⁵ reports a case in which collapse and death ensued after the puncture; while Burns⁶ has seen death from exhaustion follow this operation.

¹ Wiener med. Presse, 1868, No. 29.

² Lancet, Oct. 30, 1869.

³ L. c., p. 271.

⁴ Wiener med. Pre-se, 1872, No. 42.

⁵ Dublin Journ. Med. Sci., May, 1866, p. 453.

⁶ Philadelphia Med. Report., No. 15, 1871.

The attempt has been made to prevent the refilling of the cyst, by means of a methodical compression of the abdomen. Baker-Brown has especially recommended this plan of treatment. The result, however, is so doubtful—even when very forcible compression is exercised methodically, and kept up for a considerable length of time,—and the treatment is so troublesome and tedious, and, so far as the patient is concerned, so annoying and painful, that, as a rule, this method has been discarded.

Moreover, *the puncture, with subsequent drainage*, is no longer employed through the abdominal wall, since the purulent and ichorous secretion from the interior of the cyst, owing to the presence of air in the cavity, cannot be entirely obviated. The necessary cleansing of the cyst involves an exceedingly irksome and protracted treatment; and, furthermore, the danger of the inflammation of the walls of the cyst extending to the peritoneum, or of septicæmia from absorption of the decomposed contents of the cysts, is always imminent. This method of treatment, therefore, is only justifiable when the tumor is suppurating, or ovariectomy is, for some reason or other, impracticable, and a puncture per vaginam impossible.

But these objections apply in a much less degree to the puncture, with subsequent drainage, when performed per vaginam, since in this case the opening is made in the most dependent part of the cyst, and thus any stagnation of the decomposing secretion within the cyst is prevented. But inasmuch as the larger ovarian cysts are generally situated so high up as to be with difficulty accessible from the vagina, this method of treatment is only admissible in certain cases especially suited to it, foremost among which stand those in which the cyst has become adherent in the cul-de-sac of Douglas. But for these cases this method is all the more valuable, for the reason that the operation of ovariectomy is contra-indicated on account of the adhesions in the true pelvis. Henckel,¹ Schwabe,² Kiwisch,³

¹ Med. chir. Ann., 7 Samml. Berlin, 1760, p. 26.

² Hufeland's Jour. f. prakt. Heilk., 1841, December, p. 89.

³ Prager Viertelj., B. X., p. 90.

Schnetter,¹ Corliss,² and Tillaux³ have all reported cases in which the puncture per vaginam was followed by a cure.

Puncture of a cyst, with the subsequent injection of iodine, ought, in our opinion, notwithstanding the good results which G. Braun⁴ has thereby obtained, to be discarded, since it is dangerous; it offers very uncertain chances of success, and it is properly applicable to only a very few cases. For the iodine solution can only be injected into one cyst, and hence, even in the event of a favorable result, but one cyst is obliterated, and therefore a permanent cure can only be expected in the case of a unilocular tumor, which is a comparatively rare form, and is, besides, occasionally cured by the simple puncture; in this form, too, the operation of ovariectomy is likely to be successful. Therefore, considering that the dangers which accompany the employment of the iodine injections are by no means trivial; that they may result in iodine-poisoning (in cases where the iodine is either intentionally left behind in the cyst or cannot be again withdrawn), or in inflammation of the cyst, with suppuration or subsequent peritonitis; in the escape of the iodine from the punctured cyst into the abdominal cavity, with consequent peritonitis; considering all these things, it is far safer, in unilocular tumors, to employ the simple puncture, and where this is not followed by obliteration of the tumor, to fall back upon ovariectomy, as being much surer and attended with scarcely any more danger. It should be wholly discarded in cases of multilocular cysts, or, if we attempt a radical cure by this method, it must be only in very exceptional cases, where the operation of ovariectomy is refused.

Moreover, the plan of establishing a communication between the cyst and the abdominal cavity has very justly met with no approval, since this method is decidedly dangerous, and the chances of effecting a cure are to the highest degree problematical.

We have yet briefly to mention an operation which was first

¹ Verh. d. Würzb. phys. med. Ges., 1854, B. V., H. 1.

² Philadelphia Med. and Surg. Report., Jan. 16, 1869.

³ Gaz. hebdom., 21 Mars, 1875.

⁴ Fürst, Wien. med. Pr., 1869, Nos. 18-23.

proposed and practised by Le Dran, in 1737, and consisted in making an incision through the walls of the abdomen and of the cyst, and then uniting the edges of the cystic with those of the abdominal wound. A large opening was thus made, which communicated directly with the cavity of the cyst. Since this operation is accompanied with much greater danger than ovariectomy, it should only be performed in those cases in which the operation of ovariectomy is begun, but, for some reason or other, cannot be proceeded with.

What results may be obtained by electrolysis the future has yet to show. The instance of a cure of an ovarian cyst, reported by Fieber² and confirmed by C. Braun, is certainly very striking.

The operation of ovariectomy for the radical cure of ovarian cysts has decidedly taken the front rank during the last ten years.

OVARIOTOMY.

In addition to the literature already mentioned, consult also: *Lizars*, Observations on the Extraction of Diseased Ovaria. Edinburgh, 1825.—*Clay*, Cases of Peritoneal Section for the Extirpation of Diseased Ovaries. London, 1842.—*Simon*, Scanzoni's Beitr. z. Geb., B. III., p. 99.—*Dutoit*, Die Ovariectomie in England, Deutschland und Frankreich. Würzburg, 1864.—*Koeberlé*, Sur le traitement des kystes de l'ovaire par l'ovariectomie. Paris, 1865.—*Spencer Wells*, Diseases of the Ovaries, Vol. I. London, 1865; German translation by Küchenmeister. Leipzig, 1866.—*Krassowsky*, De l'ovariectomie. St. Petersburg, 1868.—*Grenser*, Die Ovariectomie in Deutschland. Leipzig, 1870.

History of the Operation.

Ovariectomy, that is, the removal of an ovary which has degenerated into a tumor, has nothing whatever in common with the removal of the healthy ovary, an operation not infrequently performed upon animals to fatten them, and one which is also occasionally practised upon the human female. The Lydian kings are said to have had female eunuchs as servants in their harems; and it is related of Gyges that he had his concubines spayed in order to preserve the charm of their figures. It has been reported, at a very recent date, that an Hungarian swine-

¹ Mém. de l'acad. de chir., II., p. 431.

² Wien. med. Pr., 1871, No. 15.

herd spayed his own daughter in the same manner in which he was accustomed to operate on his sows, in order to control her illimitable lust.

From the close of the seventeenth century propositions had been made to extirpate, by laparotomy, tumors developed from degenerated ovaries. Ephraim McDowell, of Kentucky, however, was the first man to perform ovariectomy in a rational and deliberate manner. This he did in December, 1809, on the person of a Mrs. Crawford. The case was successful; and the patient died in 1841, at the age of seventy-nine years. McDowell performed the operation thirteen times in all, and in eight of his cases the cure was complete.

The honor of having been the first to perform ovariectomy in a methodical manner, for the radical cure of ovarian tumors, cannot be denied McDowell, although a few cases of accidental ovariectomies were recorded at an earlier date.

Thus, B. Kirkland, in a work published at London in 1786, reports that in a woman who had been punctured for ascites, a cyst projected through the unclosed opening, which he extracted, and thus cured the patient. Least of all can Laumonier, of Rouen, be regarded as the originator of ovariectomy, for the operation performed by him in 1776 had reference to a pelvic abscess in a puerperal woman; and he seems to have excised and removed the healthy ovary and the fimbriated extremity of the Fallopian tube through the opening.

McDowell's procedure found favor but very gradually, for the fear of opening and injuring the abdominal cavity created such deep-seated prejudice that even the boldest surgeons, such as Dieffenbach and others, condemned the operation as an unjustifiable risk. In America, McDowell was followed by Nathan Smith, in 1822, and then by Atlee, Peaslee, Sims, Storer, and others; in England and Scotland, by Lizars, in 1825, by Granville, in 1827, and then especially by Clay, Baker-Brown, Spencer Wells, Tyler Smith, and others. In Germany, Chrysmar, in Isny (Württemberg), was the first (1819) to follow him, by operating in three cases (once with success); then followed Quittenbaum, Dieffenbach, Bühring, Langenbeck, Martin, Stilling, Nussbaum, Billroth, Spiegelberg, Veit, and others.

In France ovariectomy, with the exception of a few isolated cases, dates from the year 1862, when Koeberlé began to operate, and Nélaton went to England to learn the operation from personal observation. Besides these surgeons, Péan has operated more frequently and with very successful results.

In consequence of the numerous operations performed with favorable results, ovariectomy is now to be regarded as a recognized acquisition to surgery. It is an operation which, performed in accordance with proper indications and safe rules, which have been laid down as the result of experience, will always be classed among the greatest surgical procedures; but also one which radically cures an otherwise incurable malady, and offers a more favorable prognosis than most other capital surgical operations.

Before proceeding to the description of the details of the operation, we will endeavor to define its indications. As ovariectomy is a serious operation under any circumstances, it should not be undertaken as long as the tumor does not produce considerable disturbances difficult to endure. These disturbances are almost exclusively due to the size of the tumor. Only exceptionally, as, for instance, when it is adherent in the true pelvic cavity, does such a tumor give rise to troublesome and alarming symptoms at an early period. It is just in these cases, however, that ovariectomy is, as a rule, contra-indicated, on account of the adhesions in the true pelvic cavity, so that puncture per vaginam, with subsequent drainage, becomes then the legitimate procedure. Ovariectomy, therefore, should be almost exclusively confined to tumors of tolerably large size; and in these cases, if the tumor increases, and by its volume produces marked disturbances, the operation should be performed, unless especially contra-indicated. A simple puncture can be made without any risk, and is certainly indicated for diagnostic purposes in many cases, but all other treatment is best abstained from.

Ovariectomy is indicated in those cases in which the patients are otherwise lost beyond all apparent hope, and it appears imperatively demanded not to delay the operation too long, for with the increasing growth of the tumor the strength of the

patient rapidly sinks, and the prognosis of the operation thereby becomes decidedly less favorable.

The operation is in general contra-indicated whenever there is disease of some other important organ, which in itself may jeopardize life; it is contra-indicated, moreover, if there is any cancerous degeneration of the ovary; for when the diagnosis is clear, the cancerous degeneration has already progressed so far that radical removal can no longer be thought of.

From a practical point of view the most important contra-indication is the existence of adhesions in the true pelvis. If they are present to any considerable extent, a great amount of tearing is necessary to detach them. Troublesome hemorrhage, as well as injury to the rectum, bladder, or ureters, is difficult to avoid. Ovariotomy, under such circumstances, is all the more to be avoided, because just in these cases, where adhesions exist in the true pelvis, is the establishment of a permanent opening at the posterior part of the vagina, a tolerably safe procedure.

While in the true pelvis even superficial adhesions are fatal to the success of an ovariotomy, adhesions in the upper part of the abdomen, *e.g.*, with the omentum and peritoneum, present no contra-indication; in fact, according to Spencer Wells, the prognosis in these cases is hardly any worse at all.

Suppuration of the cyst and the peritonitis caused by the tumor might well be regarded as contra-indications. But this opinion is absolutely incorrect, for it may be said that ovariotomy is especially indicated in just such cases.

The results produced by inflammation and suppuration of the interior wall of the cyst place the life of the patient in such jeopardy that it would seem imperatively demanded to remove by operation the cause of the danger—the entire suppurating cyst. Experience has shown, further, that even in the worst cases of suppuration of the cyst, with the patient almost moribund, a radical cure has nevertheless been effected. Statistics of the operation under such circumstances are extremely interesting. Veit¹ operated unsuccessfully, Keith² successfully, and

¹ *Schroeder*, Berl. klin. Wochen., 1867, No. 40, 1.

² *Lancet*, July 8, 1865.

Freund¹ operated successfully in two cases, in the first of which there was also peritonitis at the same time. Pridgin Teale² made a puncture with an aspirator, which was followed by suppuration and the development of gas; and although the ovariotomy was performed when the cyst was partially gangrenous, the case resulted in a cure. In the case reported by Holmes,³ also, the cyst suppurated after the puncture, and the operation resulted favorably, notwithstanding the existence of pelvic adhesions. John Clay⁴ reports the case of a patient who became moribund in consequence of the inflammation of the cyst, which followed a puncture, and in which a cure was effected by ovariotomy.

Existing peritonitis is just as little to be regarded as a contra-indication, for it may be argued that the peritonitis is occasioned by the ovarian tumor, and, therefore, the best treatment for the peritonitis in these cases is the removal of the exciting cause, that is to say, the extirpation of the ovarian tumor. On account of the danger from the peritonitis in these instances, ovariotomy is often the direct means of saving life. The prognosis in these cases is certainly not very unfavorable.

The peritonitis is most frequently occasioned by the rupture of the ovarian tumor. Out of twenty-four cases with peritonitis, in which Spencer Wells⁵ operated, recovery ensued in nine; Kütke⁶ and Tibbits⁷ operated unsuccessfully, and Tracy⁸ successfully.

I have myself operated twice with existing peritonitis. Both cases present so much that is interesting that I will at least report them briefly.

An unmarried woman, forty years of age, entered the institution, apparently in advanced pregnancy, and expecting to be confined in about four weeks. She had been confined sixteen years before, and had menstruated irregularly for seven years, ever since she had had typhus fever. On examination the abdomen was found to be as large as at the end of pregnancy, yet it was evident that there was an ovarian tumor lying in front of the uterus. This was distinctly elastic, but did not fluctuate.

¹ Berl. Beitr. z. Geb. u. Gyn., B. II., H. 1, p. 50.

² Brit. and For. Med.-Chir. Review, April, 1874, p. 504.

³ Medic.-Chir. Transac., Vol. LV. London, 1872.

⁴ Lancet, September 7, 1872.

⁵ L. c., p. 79.

⁶ Nederl. Tijdschr. voor Geneesk., 1871, Afd. 1, No. 453.

⁷ Med. Times and Gaz., March 28, 1874.

⁸ Brit. Med. Jour., 1872, Vol. II., p. 454.

Crepitation could be felt all over the anterior surface of the tumor, and a loud friction sound could be heard on auscultation. Within the next ten days the crepitation and friction sounds gradually disappeared, while symptoms of subacute peritonitis (tenderness, free exudation, and fever) appeared.

Ovariectomy was performed according to Lister's method. During the operation it became evident that the tumor was agglutinated in its entire extent to the anterior abdominal wall, though so loosely that the two surfaces could be separated by the simple passage of the hand. The hyperæmic and disseminated hemorrhagic condition of the surface of the tumor, the deeply injected and inflamed coils of intestines, and the abundant exudation, evinced the intensity of the inflammation. After puncturing the tumor with a Veit's trocar not a drop of fluid escaped, thus showing that the tumor was a perfectly solid, glandular one, without any large cystic cavities. The inner layers, however, resembling fibrinous deposits, were so friable that they could be partially removed by the hand, and thus the tumor was somewhat diminished in size.

The first few days after the operation there were marked signs of peritoneal irritation; but the meteorism diminished after the fifth day, and recovery ensued without any further trouble.

The case is especially interesting in a diagnostic point of view, inasmuch as the friction sound indicated the formation of adhesions, and the disappearance of this sound warranted the conclusion, which prompted the immediate performance of ovariectomy, that the agglutination, although still loose, had become complete.

The second case was a married woman, thirty-six years of age, who had been confined once, and had been punctured five times for intercurrent ascites. A sixth puncture, which was performed in my presence, gave escape to a viscid, brownish fluid, of the consistence of the usual contents of colloid cysts. The fluid, as examined by von Gorup, was of a brownish color, tolerably fluorescent, and of viscid, ropy consistency. The reaction was decidedly alkaline; the specific gravity 1.023. Of albuminous compounds, it contained some alkaline albuminate, paralbumen (but little), and considerable serum-albumen.

After the puncture a multilocular ovarian tumor, about the size of the uterus at full term, could be felt in the still greatly distended abdomen. Per vaginam the uterus could be felt drawn high up; and the whole of the vaginal cul-de-sac was uniformly filled with a firm, sensitive mass.

From the contents discharged by the puncture, and from the result of this examination, the diagnosis was made of a multilocular ovarian cystoma, the largest cyst of which only had been emptied each time by the puncture.

At first I declined to perform ovariectomy, on account of an old extensive pleuritic exudation, which compressed the entire left lung, and on account of the (supposed) presence of firm adhesions in the true pelvis; but it was eventually performed at the earnest solicitation of the patient.

It then appeared that the fluid which had been drawn off by the puncture had been contained in the free cavity of the abdomen. The peritoneum, moreover, had become altered in a very peculiar manner, so as to resemble closely that form of

chronic peritonitis described by Friedreich¹ and Bäumler,² which is sometimes seen after repeated puncture of an ascites. The parietal peritoneum was transformed into a dense layer, more than one centimetre in thickness, by the deposition of whitish, fibrinous, and in part broken-down tuberculous masses. Free fibrinous coagula were found floating in the fluid of the abdominal cavity, and deposited in abundance towards the true pelvis. The omentum was dark-brown, and traversed by large pulsating vessels; the intestines were brownish-red, and lightly covered with exudation. After the removal of the tumor, the whole abdominal cavity was repeatedly washed out with a very dilute solution of carbolic acid, and the fibrinous flakes were removed as much as possible. After puncturing Douglas's cul-de-sac, I closed the abdominal wound. In consequence of the thick, unyielding peritoneum, the edges of the wound appeared elevated into a stiff ridge, extending from the symphysis to the umbilicus.

The general condition after the operation was good; the pulse being 76. From the third day, however, the condition became worse, the wound gaped at the upper part and discharged thin, offensive secretion. The patient died on the eighth day.

At the autopsy the pleuritic exudation of the left side was found to be discolored, offensive, and decomposed. There was also an abundant, sanious, and somewhat offensive secretion in the abdominal cavity. The whole wall of the peritoneum was thickened from chronic inflammation and fibrinous deposits, the latter being partially detached. All the abdominal organs, especially the liver and spleen, were covered with thick, callous peritoneum.

The case is diagnostically interesting, inasmuch as the peritoneal fluid very closely resembled cystic fluid, and because the thick, fibrinous masses, which had gravitated towards the true pelvis, suggested the diagnosis of extensive adhesions in the true pelvis.

Ovariectomy may also become a really life-saving operation when sudden enlargement follows hemorrhage into the cyst, with the onset of acute manifestations of anæmia and peritonitis. Spencer Wells³ on two occasions arrived too late to operate under just such conditions, death having already occurred. Wiltshire,⁴ however, was enabled to save his patient by ovariectomy.

The accompanying peritonitis is to be diagnosticated in the usual manner, especially by the tenderness of the abdomen, the elevated temperature, and a gradually accumulating exudation in the abdominal cavity.

¹ Virchow's Archiv, B. 58, p. 35.

² E. l., B. 59, p. 156.

³ L. c., p. 264.

⁴ Pathol. Trans. of London, Vol. XIX., p. 295.

In cases of suppurating cysts, also, there is tenderness ; but it is limited to the cyst itself. The pulse is frequent and small, and the temperature exhibits evening exacerbations. Moreover, the cyst grows rapidly, and feels unusually hard in consequence of the increased tension. The rapid emaciation of the patient is also striking.

The diagnosis of adhesions is, as a rule, very difficult to establish. Those still in the true pelvis are the easiest to diagnosticate, and they are also by far of the greatest importance. If the pelvic entrance is felt to be uniformly filled with a firm mass, which adheres fast to the sides of the pelvis, and which is closely connected with the sides of the uterus, and if the latter organ is immovably fixed, extensive adhesions to the uterus and its neighboring organs are evidently present. Moreover, an unusually high position of the uterus, as well as a decided elongation of its cavity, indicates that the tumor is adherent to the uterus ; for the pedicle, as a rule, is so long that the uterus remains in its normal position ; at the same time this should not prevent us from performing the operation of ovariectomy, provided the uterus is fairly movable, and the pelvic entrance is not occluded by firm products of exudation.

If, on the other hand, the uterus lies low down, is readily movable, and of normal length, and only the lower portion of the tumor can be felt in the superior strait of the pelvis, all thoughts of firm adhesions in the true pelvis may be excluded. The same indications are also valuable for determining the length of the pedicle, inasmuch as it is long under the latter conditions and short under the former.

The determination of the presence of adhesions in the abdominal cavity itself is more difficult, but at the same time much less important. The history of the case must be taken into consideration, if the question is raised whether adhesions will be found during the operation. If the tumor has developed slowly and imperceptibly without inflammatory manifestations, if it has imperceptibly risen into the false pelvis as it increased in size, then it is likely that there will be no adhesions, even in the case of large tumors. If, on the other hand, unquestionable symptoms of peritoneal irritation have appeared dur-

ing the course of the disease, the existence of adhesions may be premised.

Palpation also may furnish indications, inasmuch as the abdominal wall can be made to slide over the tumor, if there are no adhesions with the anterior abdominal wall. In cases, however, of very great tension this indication may be indistinct; and it has no bearing on cases in which adhesions exist posteriorly. If crepitation is felt on palpation, or a friction sound be heard on auscultation, the existence of firm adhesions may be safely excluded; although, as the first of the two cases reported by me clearly showed, adhesions may become developed.

The Operative Procedure.

Before the operation is commenced the necessary preliminaries should be thoughtfully and carefully considered.

In the first place, the operation should be performed in a healthy locality; best in a private house, or at least in a small hospital in which no infectious diseases prevail. The apartment should be large, light, easily ventilated, and free from all unnecessary furniture. The bed should be prepared in as simple a manner as possible. The most suitable one is an iron bedstead, with a horse-hair mattress, and at most a small feather-bed. It is well to place two beds, exactly alike, near each other, so that the patient can be changed without any trouble.

It is extremely desirable to have an intelligent, painstaking, self-sacrificing attendant—one competent to record the temperature and use the catheter.

For some weeks before the operation the patient, especially if not accustomed to keep her chamber, is to be treated as an invalid, in order to accustom her somewhat to that mode of life. Spencer Wells makes it an especial point that the operation should not be performed on a patient who only passes but a little concentrated urine, until a considerable daily urinary secretion has been established by the administration of a lithium salt.

In order to judge of individual deviations of temperature and pulse it is advisable to take regular morning and evening observations for some days before the operation.

The chamber in which the operation is to be performed should be well warmed, but not too hot. Spencer Wells does not approve of keeping the apartment filled with steam,—a point on which English surgeons formerly laid great weight.

The operating-table should be placed opposite a window, so that the operator, standing at one side of the table, may have the full advantage of the light; and, above all things, it must not be too wide, as it is very inconvenient to operate over a broad table. A mattress should be placed upon the table, and the patient should be chloroformed while lying upon it.

Spencer Wells warmly recommends chloromethylene as an anæsthetic; he has used it in two hundred cases of ovariotomy, and always with good results. Vomiting and sick headache, so common with chloroform, are exceptional with chloromethylene.

The instruments (including those rarely required) should lie on a table near the operator.

But few instruments are necessary for ordinary, uncomplicated operations: a sharp, bellied scalpel to divide the abdominal wall, a director to use in slitting up the peritoneum, forceps, Muzeux's double hooks or Nélaton's toothed forceps (Fig. 111), by means of which the walls of the cyst may be firmly held, a very thick trocar for emptying the cyst, a clamp for fastening the pedicle in the wound, and, finally, ligature forceps, needles, and the best of ligature silk of different thicknesses. In more difficult cases it will also be necessary to have fine cauterizing irons, a clamp, armed with a poor conductor of heat, for restricting the action of the cautery iron, a wire *écraseur*, and any other instruments that the circumstances of the case may require.

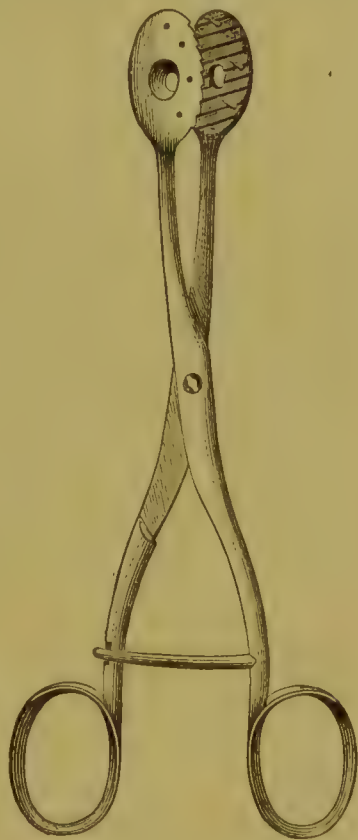


FIG. 111.
Nélaton's forceps for seizing the walls of the cyst.

As to the trocar, it is well to use the one mentioned by Spencer Wells, which seizes the cyst externally by means of hooks, or else Veit's trocar, in which the hooks spring out from the inside (Fig. 112).

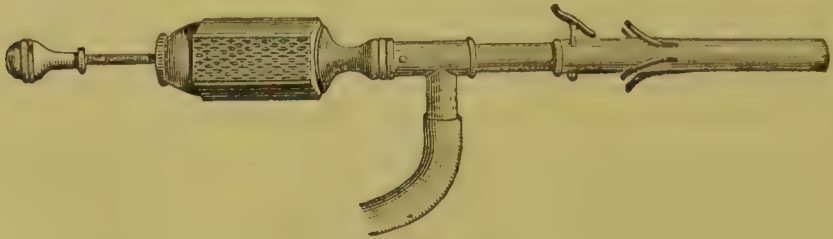


FIG. 112.
Veit's trocar, with the hooks extended for holding the walls of the cyst.

There are a great many varieties of clamps. A good clamp must be able to hold its position well, even on delicate structures, but must not have so sharp an edge as to cut. The pressure must not be unequal at both ends of the clamps, as is the case with clamps constructed on the principle of a pair of compasses, but the two arms should work parallel, and the clamp should be so constructed that it will not allow the stump, when grasped, to spread out laterally to too great an extent. These requisites are best exemplified in the clamp devised by Atlee,¹ in which the branches work parallel to each other, and the spreading out of the stump sideways is prevented by lateral needles; and also in the clamp recently employed by Spencer Wells, by which the stump is pressed together concentrically. Fig. 113 represents the old, and Fig. 114 the new, clamp of Spencer Wells.²

The clamp used in connection with the application of the actual cautery, the so-called "cautery clamp," is employed to arrest hemorrhage from adhesions; but it is also applicable to the stump. In using it, the clamp is fastened provisionally either to the stump or to the mass of adhesions, the tumor is then burnt through with the hot iron, and finally the single

¹ Amer. Jour. Med. Sci., April, 1871, p. 353.

² Other clamps have been described by *Storer* (Boston Gyn. Jour., Vol. I., p. 212; III., p. 7; and VI., p. 265), by *Lazarewitch* (Boston Gyn. Jour., Vol. III., p. 85), and by *Darson* (Amer. Jour. Obstet., IV., p. 304).

blood-vessels are separately cauterized with pointed cauterizing irons. In order that the iron should not burn too deeply, which it is especially important to avoid in cases of adhesions with the intestines, the upper surface of the clamp is covered with some poor conductor of heat, like ivory. The clamp protects the remaining portions, and the arrest of hemorrhage is far more certain than if each blood-vessel were separately cauterized, inasmuch as the blood-vessels are compressed by the clamp throughout a considerable extent.

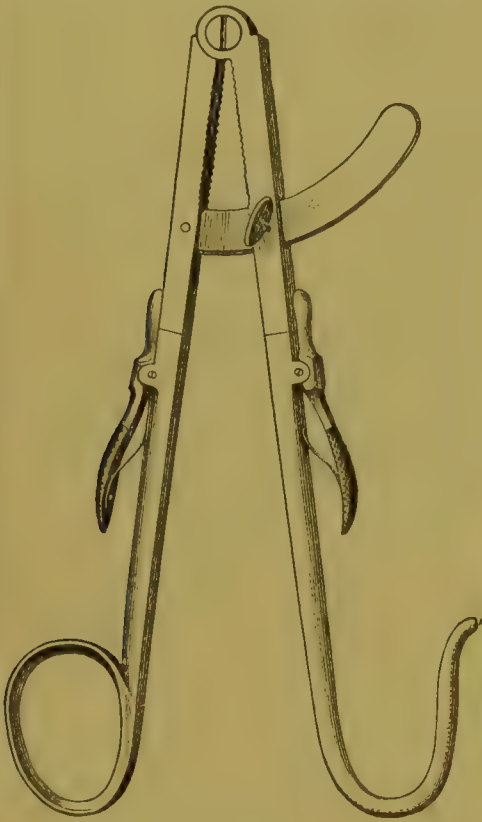


FIG. 113.

The old clamp of Spencer Wells. The handles can be removed.



FIG. 114.

New clamp of Spencer Wells. The handles can be taken off, so that only the compressing ring remains on the stump (see Fig. 115).

We now pass to the *technical details of the operation*, and shall first describe it as it is usually performed in a simple, uncomplicated case.

The operation is performed with the patient lying upon her back, in an easy position. All other positions, as for example the half-sitting one (Spiegelberg) or the lateral posture (Nuss-

baum), which have been recommended with a view of preventing the escape of the cystic contents and blood into the abdominal cavity, are unnecessary, inconvenient, and may readily lead to prolapse of the intestines.

The English operators very conveniently cover the patient with a rubber cloth, in which a large round opening has been cut out to accommodate the enlarged abdomen. The edges of this opening being fastened to the abdomen in a water-tight manner by means of strips of adhesive plaster, the fluids from the abdominal cavity and from the cyst, and also the blood, all flow down upon this rubber cloth, and thus the patient is protected from a wetting.

The bladder having been emptied with the catheter, the operator takes his position on the right side of the patient, and, with a strong knife, divides the abdomen through the linea alba. Only a short incision is made at first, from seven to fourteen centimetres in length, especially if it is known that the tumor is composed of but few solid parts; the incision can readily be enlarged, if, during the course of the operation, it appears to be insufficient. The incision is so made that its lower angle is about five centimetres above the symphysis pubis. The abdominal wall should be divided gradually, the superficial layers being divided by separate strokes of the knife. First comes the external skin, then the subcutaneous connective tissue with the adipose layer, which varies greatly in thickness, and finally the fascia, which is loosely connected with the peritoneum; after the fascia has been divided, the distended peritoneum appears in view.

Before the abdominal cavity is opened, care must be taken that all hemorrhage has ceased. The hemorrhage is very slight, as a rule, and is controlled by ligating the small divided branches of the epigastric artery; the bleeding from the larger veins, if it has been found necessary to divide them, may be arrested by torsion or ligature.

The next step is to raise the peritoneum with the hooked forceps, make a small opening in it, and then divide it upon the director throughout the entire length of the external incision.

The bluish, glistening surface of the cyst, which now appears in the wound, is punctured with a large trocar, and the cyst

emptied of its contents. While the tumor is undergoing collapse, the assistants must press the abdominal wall closely upon it, so as not to allow the intestines or omentum to fall between the walls of the abdomen and the cyst.

When the cyst is nearly empty, it is gradually dragged through the wound, either by means of the trocar, or by Muzeux's hooks or Nélaton's forceps; a manœuvre readily accomplished if it is empty and there are no adhesions. During the withdrawal of the cyst the remainder of its contents are emptied, so that the collapsed envelope of the cyst, when entirely withdrawn, is only connected by its pedicle with the organs in the true pelvis.

The clamp is to be fastened closely around the pedicle, just beneath the tumor, and then the latter is to be cut off in such a manner that a short stump will still project beyond the clamp (if the tumor is cut close to the clamp, the pedicle may become withdrawn out of its grasp).

If no blood or cystic contents have escaped into the abdominal cavity during the operation, sutures are to be applied; before doing this, however, two fingers should be introduced into the abdominal cavity for the purpose of ascertaining whether the uterus and the remaining ovary are in a normal or nearly normal condition. In applying the sutures the needles are to be passed

through the entire thickness of the abdominal wall, so as to include the peritoneum, which is an important point. A suture is applied at the lower part of the abdominal wound, and then the pedicle, held firmly outside by the clamp, is to be pressed down against this suture, and a second suture placed directly

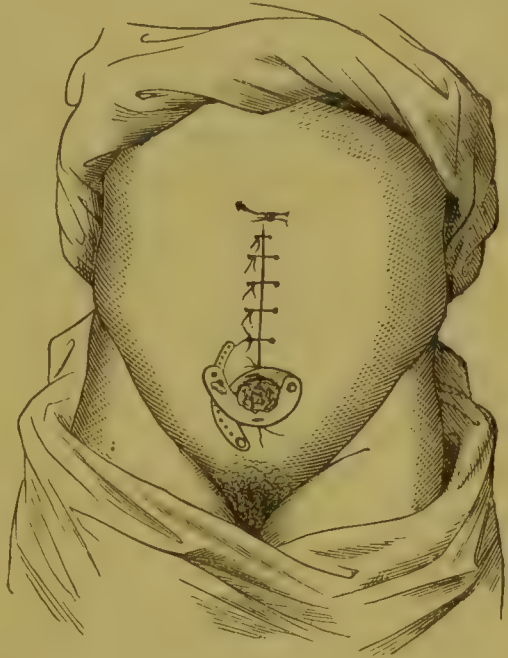


FIG. 115.

The abdominal wound after the operation. The pedicle lies inclosed within the clamp, at the lower angle of the wound.

over it. The remaining portion of the wound is to be united in the usual manner. If the skin gapes between the sutures, superficial stitches should be taken between the deep ones. The abdominal wound is thus completely closed, and the pedicle, firmly held by the clamp, lies at its lower angle (see Fig. 115).

The operation then being finished, a greased cloth and a piece of flannel are placed over the wound. Very frequently, however, the course of the operation is not so simple, as many serious complications may render it much more difficult.

In the first place, it may be difficult to recognize the peritoneum, as such, after making the incision through the abdomen. This may happen :

1. When there is marked ascites ; after we have cut down to the peritoneum, this membrane may be forced forward by the free abdominal fluid and protrude into the wound, just like the wall of a cyst ;

2. When the inflamed and thickened peritoneum has become unrecognizable in cases of chronic peritonitis ;

3. When the peritoneum and the wall of the cyst have become adherent in the region of the incision.

In such cases the fascia may be mistaken for the peritoneum, and the latter for the sac of the cyst, and in the belief that the peritoneum is already divided, the operator may actually begin to tear away the peritoneum from the anterior wall of the abdomen. This is always an exceedingly disagreeable accident, although a case reported by Spiegelberg shows that the torn surfaces may again become adherent. It is therefore preferable in doubtful cases to cut through the supposed or true cyst. If the actual cyst has been cut through, there is no harm done, since, owing to the firm adhesion between the surface of the cyst and the peritoneum, the cystic contents cannot escape into the abdominal cavity, and the adhesions can be readily torn away when the cyst has been emptied, and in cases of very extensive adhesion are removable only in that way. If, however, the case is one of ascites, the operation has been performed in the only proper manner.

In case adhesions are found throughout the whole extent of the incision, the incision is then to be lengthened until we find a

spot where the peritoneum and cyst are not united together. The separation of the adhesions is commenced at this point.

This *separation of the adhesions* is to be performed, when they are loose, by introducing the hand between the cyst and the peritoneum, and simply separating the parts from each other. Even extensive adhesions can often be detached in this way without difficulty.

If, however, there are some firm adhesions, especially on the posterior wall of the cyst, they may be disregarded until the cyst has been emptied.

In tearing away firm adhesions, especial care must be taken that no portion of peritoneum and omentum, or, what is much less likely, of the intestine, is removed with them. It is better practice to leave portions of the cyst walls adherent to these organs. Only firmly adherent portions of the omentum may be excised when requisite; but then care must be taken, of course, to arrest the hemorrhage from them. As a rule, however, it is better to dissect them up from the surface of the cyst.

In case the multilocular cyst is not wholly emptied by the trocar, an effort should be made to reach the septa of the contiguous larger cysts with the canula, in order to penetrate them. If this effort is unsuccessful, and the tumor still continues to be very large, the remaining cysts must be punctured by another trocar, or by the same one; great care being taken, in the latter instance, that the cystic contents do not escape into the abdominal cavity through the opening made by the first puncture.

It is very desirable that the tumor should be drawn out through a small incision, inasmuch as the prognosis is rendered much graver in cases of very large incision. In five hundred cases of ovariectomy Spencer Wells had a mortality of 23.4 per cent. among cases in which the incision did not exceed six inches in length, and a mortality of 40 per cent. where it exceeded six inches. On the other hand, however, the forcible withdrawal of the tumor must be avoided, inasmuch as the crushed edges of the abdominal wound heal badly. It is better to continue the incision to the navel, and, under certain circumstances, even higher up, and to the left of the navel (on account of the round ligament of the liver).

While the tumor is being gradually drawn out, the remaining adhesions are put upon the stretch and must now be separated.

It is always best to separate them from the surface of the cyst by the fingers, the finger nails, or the handle of the scalpel. If this does not succeed, they must be divided, and the bleeding central ends either cauterized or ligated.

If there are only insignificant vessels in the adhesions they can be simply divided either with a knife-like cauterizing iron or with the glowing platinum wire ; but if large vessels course in the adhesions, they should be burnt through upon the cautery clamp ; and the arrest of the hemorrhage is not absolutely certain even by this procedure. The cauterized parts, if they do not bleed, are to be replaced in the abdominal cavity, and no apprehension need be entertained concerning them. If the divided adhesions have been ligated *en masse*, or each vessel has been ligated separately, it is better to cut off the ligatures short and to let the ligated portion fall back, unless it can be brought near the incision, which can readily be done, as a rule, in the case of the omentum. We shall recur to the fate of the cauterized places and the ligatures in the abdominal cavity, when we come to speak of the treatment of the pedicle.

The omentum, lying apron-like upon the tumor, is not unfrequently adherent to the cyst throughout a great extent. As its separation from the cyst will unavoidably entail tearing and extended injury to the free edge of the omentum, it is best, in these cases, to treat the omentum in the same manner as the pedicle, that is, to let it heal in the upper angle of the abdominal wound. It can be fastened in this position either by means of a clamp or by sutures. The serous surface of the omentum then unites with the cut surface of the peritoneum. Gusserow in one case allowed the omentum to hang loosely outside, whence it gradually underwent retraction into the abdominal cavity without becoming gangrenous ; this procedure, notwithstanding the recovery which followed, is scarcely worthy of imitation.

In removing the tumor it should be held firmly, so that its weight shall not drag too much on the pedicle or on any adhesions which may exist.

Methods of Treating the Pedicle.

The pedicle, which consists of the broad ligament, the Fallopian tube, the ovarian ligament, and, as a rule, the round ligament also, and which always contains large arteries, and frequently very greatly developed veins, can be treated in various ways.

The older operators, such as McDowell and Clay, passed a ligature around the pedicle, and then allowed it to return into the abdominal cavity, the ligatures being left protruding from the lower angle of the wound. The lower part of the incision was left open for the removal of the ligatures and the distal end of the ligated pedicle, and also for the escape of the secretions from the wound.

This method of treatment has justly been abandoned, although it cannot be denied that Clay and Koeberlé obtained excellent results with it. Curtis,¹ and also Storer,² have recently again allowed a portion of the wound to remain open.

At present it is usual to adopt either the so-called extra-peritoneal method, which consists in allowing the pedicle to heal in the abdominal wound, so that the abdominal cavity remains completely closed and the place from which the tumor was detached lies outside the peritoneum; or else the intra-peritoneal method, in which the pedicle, after being treated in various ways, is allowed to return within the abdominal cavity, which is then to be completely closed.

The extra-peritoneal method was first employed by Stilling, in Cassel,³ in 1841, and the intra-peritoneal method by Nathan Smith, of Baltimore, in 1821.

The Extra-peritoneal Method.

A clamp is placed around the pedicle, in the manner already described, and firmly secured; after which the tumor is cut off so as to leave a small portion in front of the clamp. In order

¹ Boston Gyn. Jour., IV. p. 201.

² E. l., p. 258, and Vol. V., p. 144.

³ Holscher's Annalen, 1841, pp. 261 and 393.

that this projecting portion shall not become ichorous, it is painted over with chloride of iron, so that it may become perfectly desiccated.

Instead of the clamp, other extra-peritoneal methods have been employed. Koeberlé secured the pedicle with the “*serrenoend*,”¹ and Scanzoni and Neugebauer have followed his practice. By others the pedicle is stitched into the wound, or secured there by means of a transfixing needle. The external fixation of the pedicle, however, is best and most conveniently accomplished by means of the clamp.

The Intra-peritoneal Method.

The essential element of this method is to devise some means of safely preventing subsequent hemorrhage, without at the same time so altering the pedicle as to excite local inflammation.

The actual cautery and the ligature concur in attaining this end.

The actual cautery is especially warmly recommended by Baker Brown; Spiegelberg uses the galvano-cautery.

The fear that the gangrenous eschars, replaced within the abdominal cavity, may excite peritonitis, seems to have little foundation; it is much more likely to become encapsuled by means of a circumscribed inflammation, as shown by the good results of various operations, and also by the experiments made on animals by Spiegelberg, Waldeyer,² and Maslowsky.³

The reproach is better grounded that cauterization does not surely prevent subsequent hemorrhage, especially from the large vessels; and the combination of ligation of the larger vessels with cauterization of the pedicle seems to involve serious danger,

¹ Serrenoend is a surgical instrument consisting of a steel rod, at one end of which is a steel plate pierced by two holes. A wire is passed through one of the holes, and, forming a loop, is returned through the other. Both ends of the wire are then secured to a movable slide, which can be drawn downwards by the turning of a handle placed at the lower end of the steel rod. In this way the size of the loop is gradually diminished, just as is the case with the loop formed by the chain of an *écraseur*.—TRANSLATOR'S NOTE.

² Virchow's Arch., B. 44, p. 69.

³ Berlin. klin. Wochen., 1863, No. 18.

because gangrene of the ligated portion more readily occurs under these circumstances.

For these reasons the ligature, as specially recommended by Tyler Smith, is to be preferred. The pedicle is ligated in its entire mass, or, what is better, in separate portions, and the larger vessels are secured by separate ligatures, and then the ligatures are cut off short and the pedicle is allowed to drop back. The healing goes on around the ligatures, and covers them up, or they may even¹ undergo a partial absorption, as shown by the case of Bautock;² and the hemorrhage is arrested more securely than by cauterization. The hemorrhages, which quite often take place (according to Spencer Wells, in about one-third of the cases) from the stump of the pedicle, even after it has healed, and which may give rise to hæmatocele, are not in any way dependent upon this method of treatment, being in reality menstrual in nature.

With a view of rendering the ligated stump less irritating to the peritoneum, Maslowsky³ has proposed, under the name "sero-plastic" method, to dissect a flap-like piece of peritoneum from that portion of the tumor which is to be cut off, and to cover the pedicle with it before replacement. The use of catgut for ligatures is also recommended.

The employment of the *écraseur* for cutting through the pedicle offers no safeguard against hemorrhage, and so crushes the tissues that it is not to be recommended.

Simpson has used his favorite procedure, acupressure, for the intra-peritoneal securing of the pedicle and the arrest of the hemorrhage from it. This method scarcely finds any imitators.

Torsion of the vessels also, as recommended by Beebe,⁴ affords too little safety.

The extra-peritoneal method possesses such superior advantages, all things considered, that, if the pedicle is not too short and broad, the use of the clamp is most worthy of recommendation. In this method the pedicle lies outside of the abdominal

¹ *Spiegelberg and Waldeyer*, l. c.

² *London Obstet. Trans.*, XIV., p. 2.

³ *Medic. Centralb.*, 1868, No. 56.

⁴ *Amer. Journ. of Med. Sci.*, April, 1871, p. 353.

cavity, always permits the control of any inflammation, suppuration, or hemorrhage that may occur, and is not left, as it were, to its uncertain fate in the abdominal cavity. The strain upon the uterus is not of any consequence, if the pedicle is not too short.

The clamp also has its disadvantages. It may happen, for instance, that a coil of the intestine surrounds the pedicle, and the bowel will thus be rendered impassable, or a hernia may readily be developed at the lower angle of the wound, where the pedicle has united with the surrounding parts.

The disadvantages of the clamp become more apparent when the pedicle is short, as then it cannot be held fast in the lower angle of the wound without considerable traction being exerted on the uterus and its neighboring organs. It may then occasion severe pains or give rise to peritoneal irritation, or even to tetanus.

As far as present experience goes, the extra-peritoneal treatment with the clamp is therefore most to be recommended, when the pedicle is tolerably long. If the pedicle is short, it is certainly best to ligate it with catgut in several portions (the larger vessels separately), to cut the ligature short, and allow the stump to recede. Cauterization alone does not seem to occasion peritonitis readily, yet it does not protect safely from subsequent hemorrhage; but used in connection with the ligature it may readily give rise to peritonitis.

The method of performing ovariectomy recently described by Miner, of Buffalo,¹ and to which he has given the name of "ovariectomy by enucleation," deserves careful investigation. Miner starts from the opinion that the vessels are spread out only over the superficial surface of the cyst, and that none but capillary vessels enter the true cyst wall. For this reason he goes deep down, where the pedicle spreads over the cyst wall, and enucleates the tumor by separating this vascular extension of the pedicle from the surface of the cyst. He follows the same plan with the adhesions, and in this manner performs an almost bloodless operation without danger of subsequent hemorrhage.²

¹ Amer Jour. Med. Sci., Oct., 1872, p. 391.

² The following named surgeons have operated successfully, according to Miner's method: *Knicht*, Amer. Jour. Med. Sci., 1872, p. 434; *Logan*, e. l., July, 1873, p. 122;

Procedure in Cases in which the Second Ovary is diseased.

After the tumor is separated from the pedicle the other ovary is to be felt for, and if it is healthy it is not to be meddled with.

If, however, it too has degenerated into a decided tumor, it should be extirpated in precisely the same manner as the first one. The treatment of its pedicle also does not differ essentially from the plan recommended above. If it is long, and can easily be brought into the abdominal wound, it should be placed either in a second clamp, or else ligated in several portions, and then secured to the first clamp. In case, however, it cannot be brought into the abdominal wound, it should be treated by one of the intraperitoneal methods.

It is a more difficult question to decide what ought to be done when cystic degeneration is just beginning in the second ovary.

On the one hand a relapse is threatened, which, as it may render a repetition of the operation necessary, will expose the patient a second time to the danger of the operation.

On the other hand, however, the danger of the operation in hand is considerably increased by the removal of the second ovary, as is shown by the experience of Spencer Wells, who had a mortality of 24.44 per cent. in single ovariectomies, and a mortality of 44 per cent. in double operations. Moreover, it is to be borne in mind that the removal of but one completely degenerated ovary is a very different thing from the simultaneous removal of the second also, which, although somewhat diseased, is yet able to perform its functions; for the double operation deprives the patient of her sexual characteristics. For this latter reason it is a matter of great difference whether the operation is performed on a woman who has passed the climacteric period, or on one who is still menstruating. A young woman who has ceased menstruating is to be put in the same class with the former, since it may be assumed that the other ovary is so disorganized as no longer to possess any tissue capable of performing the functions of this organ.

If, however, the patient is still menstruating, the idea of simultaneous removal of the second ovary is contra-indicated, unless it is at least three or four times the normal size.

Moreover, as already remarked, it is not absolutely certain that a return of the disease will take place, simply because the remaining ovary contains small cysts. The patient might, therefore, be unnecessarily mutilated. In case, however, a relapse should really occur, the danger from the repetition of the operation is scarcely any greater than the increase of danger which would result in the first place from attempting to remove the second ovary at the first operation.

A case reported by Spencer Wells, is extremely instructive in this connection. In 1864 he performed ovariectomy on a young unmarried girl, nineteen years of age. After the removal of the degenerated right ovary, he discovered that the left ovary was nearly twice the normal volume, and contained two cysts of the size of cherries. After some hesitation he decided not to remove this ovary, and merely emptied the two cysts. The patient recovered, was married in August, 1865, and up to July, 1871, had been confined four times.

Sometimes the *uterus*, also, is found *enlarged*, especially if the operation has been performed, knowingly or unknowingly, on a pregnant woman. The prognosis in these cases, however, is scarcely more unfavorable, and the pregnancy usually continues undisturbed. In other cases the uterus is found enlarged, owing to the presence of an interstitial or subserous fibroid. One ought to hesitate before attempting to remove this tumor, even though it should be connected with the uterus by a pedicle, inasmuch as it grows slowly, as a rule, or may even remain stationary; and its simultaneous removal adds greatly to the danger of the ovariectomy.

After the tumor has been removed and the pedicle treated in the proper manner, the next thing in order is the "toilet of the peritoneum," which is of very great importance in all cases in which a foreign substance (cystic contents or blood) has escaped into the abdominal cavity. The soiled intestines should be dried with large, clean, and new sponges, and the anterior and posterior surfaces of the uterus cleansed as carefully as possible, as well

as the posterior abdominal wall as far up as the kidneys, and especially all places at which adhesions have been separated. Spencer Wells lays a piece of sponge between the edges of the incision, so that no fresh blood from the walls of the wound can flow into the abdominal cavity, and leaves this in position until the sutures are applied.

The *application of the sutures* is best performed in the following manner: two straight or slightly curved needles are threaded with a good silken thread, and then each needle is passed through the opposite sides of the abdominal wall, from within outwards, in such a manner that the peritoneum is firmly included in the suture. After the sutures are all applied, the surfaces of the wound are again cleaned and the knots tied. The pedicle is sewed in pretty closely, but not so closely as to be strangulated.

If the skin then gapes, in cases of thick abdominal walls, superficial sutures should be inserted between the deep ones.

The inclusion of the peritoneum in the sutures is very important. In this way only can the two serous surfaces be brought in contact throughout their entire extent. They unite very quickly with each other (they have been found united within twenty-four hours, in a case subjected to autopsy), and the closure of the abdominal cavity is then again completed.

An oiled piece of cloth and a flannel binder serve for the dressing. The drawing together of the wound by means of adhesive plaster is usually unnecessary, though it is within the range of possibility that the still tender uniting surfaces may separate, especially if there be marked meteorismus or vomiting. The best way to apply the adhesive plaster is to lay long strips of it (close together and parallel) on that portion of the bed which corresponds to the patient's lumbar region, and then, the patient being laid upon these, the two ends of each strip are crossed over the anterior abdominal wall.

After-Treatment.

The after-treatment should be purely symptomatic. If the patient is in a state of collapse after the operation, or if the extremities are cold, heated bottles should be applied to the feet

and wine should be administered. If the patient is restless, or suffering from severe pain, morphia should be administered subcutaneously, or opium be given by the rectum. The catheter should be passed at least every six hours, and in such a way that the position of the patient may not be disturbed. The sutures should be withdrawn gradually, from the third to the fifth day.

The clamp and the pedicle which is attached to it fall off, as a rule, from the seventh to the tenth day; occasionally they become detached as early as the third or fourth day, and sometimes not until the fourteenth day, or even later. Too early a spontaneous detachment, or too early an artificial removal of the clamp is unfavorable, for the stump of the pedicle may then become retracted deeply into the wound, or may even fall back into the abdominal cavity within the first few days after the operation.

The following accidents after the operation evince danger:

In the first place, *hemorrhage* is to be feared; and it may take place from the pedicle or from the torn adhesions. Hemorrhage from the pedicle is readily arrested, in cases treated by the extra-peritoneal methods, by the application of the chloride of iron or the actual cautery; internal hemorrhage, however, from the retracted pedicle, or from the adhesions, is a very unfavorable occurrence, since the application of ice to the abdomen affords very doubtful assistance, so that occasionally nothing remains to be done, in case of continuous hemorrhage, than to reopen the wound and to search for the source of the bleeding.

Peritonitis also is a source of great danger; yet, as a rule, it is wholly circumscribed, provided no septic infection has occurred, and none of the various fluids has escaped into the abdominal cavity during the operation. In fact complete union by adhesion may take place in the peritoneal wound in the shortest possible period of time, without any untoward symptom, and without fever or pain. A severe traumatic peritonitis should be treated in the customary manner, with opium, leeches, and ice.

Where peritonitis is the result of *septic infection* it has a far

graver significance. To prevent this infection the greatest possible pains must be taken in cleansing the hands, the instruments, and all the utensils used in the operation; and to avoid leaving any secretions in the abdominal cavity, as they readily undergo decomposition. The gangrenous stump of the pedicle within the clamp may also give rise to the danger of infection during the few days immediately following the operation. In order that no ichorous secretion from the stump may flow into the abdominal cavity, care must be taken that the abdominal walls are stitched tightly round the pedicle, and the mortifying stump must be painted with chloride of iron so that it may desiccate and dry up.

It is very important to be able to remove the secretion which frequently accumulates in the abdominal cavity, and which is liable to undergo decomposition. This is practicable without further interference, if the operation has been performed by the method of Clay and Koeberlé,¹ who keep the communication open between the lower angle of the wound and the pedicle by means of ligatures, the serrenoeud, or the introduction of a glass tube, so that the secretion may be withdrawn by suction. As complete closure of the abdominal cavity is not practicable in these cases, this procedure is not to be recommended.

Peaslee² first proposed to wash out the abdominal cavity through the wound, in order to remove the decomposing intra-peritoneal fluid, and Sims³ has extended this proposition. Sims regards the majority of fatal cases after ovariectomy as of septic origin, and considers all reddish serum in the peritoneal space as tending to a fatal termination; he therefore advises that in every case a canula should be introduced into the deepest portion of Douglas's cul-de sac, in order to facilitate the discharge of secretion, and to insure the possibility of making an injection into the abdominal cavity.

There can be no question but that Sims's idea is too one-sided; for although I agree entirely with him in the view that infection is the most frequent cause of death (I believe that the better results in England are partly due to the fact that the

¹ Amer. Jour Obstet., Vol. III., p. 300; and Ovarian Tumors, p. 509.

² New York Medical Journal, Dec., 1872, and April, 1873.

accidental diseases of wounds are rarer in England), septicæmia does not by any means originate exclusively in the peritoneal exudation, and is not always prevented by its removal; and, moreover, small quantities of reddish serum or fibrinous exudation are not so absolutely dangerous as Sims has represented.

The possibility of being able to remove an intra-peritoneal exudation, which has accumulated after the operation, is always of the greatest importance, and it may be accomplished without very great difficulty or danger, if only proper provision has been made for it during the operation. If this has been neglected, the operative removal of the exudation presents great difficulties, inasmuch as either the closed wound must be re-opened, or Douglas's cul-de-sac must be punctured. The puncture of the latter, however, is easy and safe only when it protrudes as a tumor into the vagina; but this occurs only when the exudation is no longer free, but is encysted; in such a case the puncture is no longer necessary, and therefore the opening of Douglas's cul-de-sac during the ovariectomy has certainly a great advantage, and should at least be recommended in all cases in which there is reason to fear considerable peritoneal exudation on account of peritoneal irritation already existing or resulting from the tearing of extensive adhesions.

The safest way to provide for the discharge of the secretion is the simple puncture of Douglas's cul-de-sac, or the insertion of a canula which leads from it into the vagina. The simple puncture is wholly inefficacious, inasmuch as the wound will soon unite again; and it has yet to be decided by actual experience whether or not the end of the canula lying in the abdominal cavity does not soon lose its free communication with the abdominal cavity by inflammatory adhesions which form about it. If it is thought desirable, at the time of the operation, to make provision in the safest manner possible for washing out the abdominal cavity and for drainage of any exudation that may take place, the plan, recommended by Mursick,¹ of introducing stout silken threads, or that devised by Nussbaum,² of using a drainage tube, may be considered as the best. These are to be

¹ Amer. Jour. of Med. Sci., Jan., 1874, p. 119.

² Bayerisches ärztl. Intelligenzbl., 1874, No. 3.

passed through the peritoneal cavity in such a manner that while one end protrudes from the lower angle of the abdominal wound, the other passes out through the cul-de-sac of Douglas into the vagina.

The peritoneal cavity can then be washed out with pure water, or with a very weak solution of carbolic acid at about the temperature of 97° Fahr., as often as may be desirable.

A fatal termination from incarceration of the bowel is much less frequent. This accident results very exceptionally from the wound; it is occasioned much more frequently by the pedicle. Death may be prevented by the establishment of a fecal fistula or an artificial anus. In a case which I had the opportunity of seeing and which was operated on by Veit,¹ death occurred on the twenty-second day after the operation, from perforation of the intestines. The perforation occurred in the following manner: the omentum had become united by adhesions to the peritoneum, the left abdominal wall, and the adjacent surface of the cyst; after the operation the portion of the omentum torn off from the cyst became adherent to the upper angle of the abdominal incision, and in this way the intestine was subjected to such tension in opposite directions—the omental portion pulling it one way, and the portion adherent to the peritoneum restraining it in the other—that perforation finally ensued.

The *prognosis* of the operation varies to a remarkable degree. It depends chiefly upon the patient's general strength, the simple or complicated relations of the tumor, and also upon the skill and experience of the operator. The results of many operators show that the prognosis is more favorable than in other capital surgical operations, as, for example, the larger amputations, disarticulations, and resections. Spencer Wells, in 500 cases of ovariectomy, had 128 cases of death, and 372 cases, or 74.4 per cent., of recovery; Keith's results exhibit 84 recoveries out of his last 100 cases.

Ovariectomy through the Vagina.

Thomas² recommends the removal, in suitable cases, of small

¹ Berlin. klin. Wochenschr., 1868, No. 21.

² Amer. Jour. Obstet., III., p. 186, and Dis. of Women, p. 724.

ovarian tumors through the vagina. In these cases of "vaginal ovariectomy" the cul-de-sac of Douglas is opened per vaginam, the cyst is punctured, and the sac is then drawn out, ligated and excised, after which the pedicle is replaced.

DERMOID CYSTS.

Kohlrausch, Müller's Archiv, 1843, p. 365.—*Steinlein*, Zeitschr. f. rat. Medicin, B. IX., p. 146.—*Lebert*, Prager Vierteljahrschr., 1858, 4, p. 25.—*Heschl*, Prager Vierteljahrschr., 1860, 4, p. 36.—*Klob*, Pathol. Anat. d. weibl. Sex., p. 365.—*Pommier*, Quelques considér. sur les kystes dermoïdes de l'ovaire. Strasbourg, 1864.—*Waldeyer*, Archiv f. Gyn., B. 1, p. 304.

Etiology.

The occurrence in ovarian tumors of elements of the external integument, with hair, teeth, and bones, has always attracted the attention of physicians. Formerly these cases were considered as a sort of imperfect ovarian pregnancy, which was supposed to occur either with or without sexual intercourse.

It is only recently that light has been thrown on these abnormal formations. His¹ at first entertained the view that the Wolffian duct was formed by a folding-in of the horny layer; but this view, which was again advocated by Hensen,² was afterward discarded. Very recently, however, His³ has modified his views, in which modification Waldeyer⁴ concurs, so that they now believe that the first rudiment of the genital organs is developed from the axial cord of His, in the formation of which the upper germinal layer also participates; and that the horny layer contributes chiefly to its formation. From this we can understand how formations of the external skin can originate from parts of the upper germinal layer which have not contributed to the formation of the ovary, and how fat, bones, teeth, etc., can be produced from parts of the middle germinal layer which also participated in the folding-in of the axial cord.

¹ Archiv f. mikrosk. Anatomie, I., p. 160.

² E. I., p. 502.

³ Unters. über die erste Anlage des Wirbelthierleibes, I. Leipzig, 1868, p. 225.

⁴ Eierstock u. Ei., p. 111.

Accordingly, the first trace or rudiment of dermoid cysts is always congenital. Their further development, as a rule, begins after puberty, but in exceptional cases even earlier. Mears,¹ for example, has successfully removed a dermoid cyst by ovariotomy from a child six years and eight months of age; and Spencer Wells² has removed one in the same manner in a child eight years old.

Pathological Anatomy.

The tumors are chiefly small, not exceeding the volume of an orange, and only very exceptionally reach the volume of a man's head.

They are distinguished by the fact that their inner surface is covered with a formation perfectly analogous to that of the external skin. This inner surface of the cyst-wall, which is either smooth or uneven in places, with isolated prominences or even actual protuberances, exactly resembles in its structure the epidermis. Superficially we find thick horny layers of pavement epithelium, whose nucleated, flattened, and finally rounded cells follow each other in exactly the same manner as is seen in the outer skin as far as to the *rete Malpighii*. Under the epidermis is found a connective tissue resembling that of the cutis, which, however, does not always exhibit papillæ, and in no instance papillæ arranged as regularly as in the cutis of the skin. But a fatty layer corresponding to the panniculus adiposus is always found beneath the cutis, upon which the external connective-tissue envelope of the cyst rests.

The resemblance of this formation to the external skin is still further enhanced by the growth within them of hairs which spring from distinct hair follicles. Largely developed sebaceous glands often open into these hair follicles, and also into the free cavity of the cyst. Even sweat-glands are found in certain cases.

From these sebaceous and sweat glands secondary cystic formations may proceed, as we are taught by the interesting tumor examined by Friedlander:³ from the former, retention-

¹ Philadelphia Med. Times, Nov. 1, 1871, No. 27.

² Obstet. Jour. Great Brit., April, 1874, No. 69.

³ Virchow's Arch., B. 56, p. 365.

cysts are developed by the accumulation of horny epithelial cells; and from the latter, cysts, of which some are as large as the fist, lined with ciliated epithelium and with sero-mucous contents, which press the dermoid wall of the cysts inwards.

As a rule the hairs are long, and usually reddish or blonde in color. They are also very frequently found exfoliated in large quantities, and rolled into a ball in the contents of the cyst. I have myself seen a free ball of hair as large as a man's fist.

The cystic contents consist of a fatty, gruel-like mass, formed of the exfoliated epithelial cells and the secretion from the sebaceous glands. Cholestearine crystals are also found in them, often in such considerable quantities that the entire contents glitter. Bamberg¹ found oxalic acid in the cystic contents, large quantities of tyrosine and leucine (doubtless produced from the decomposition of the epithelium), urea, and apparently xanthine or some similar substance.

In addition to these customary formations, even bones and teeth are not infrequently found in dermoid cysts.

The bones are formed in the connective tissue in various shapes, which exhibit, however, the attributes of true bone. They are interpreted as alveolar processes, or as jaws, whenever, as is not unfrequently the case, teeth are found in them. These latter have the normal structure of teeth, although, as a rule, exhibiting but rudimentary forms. Sometimes the enamel is wanting. In Rokitansky's museum there is a preparation in which a milk-tooth has become atrophied from the root to the crown by an advancing permanent tooth. Teeth occur, moreover, free in the connective tissue, with the crown projecting into the cavity of the cyst, or entirely enclosed by connective tissue. They may be present in great numbers. Thus, in a case reported by Schnabel,² more than one hundred teeth of all sorts were found in three pieces of bone; and Paget found even three hundred.

In rare instances gray cerebral substance, and sparse, transversely striped muscular fibres have been found on the inner wall of the cyst.

¹ Obser. aliquot de ovarii tumor. Diss. Inaug. Berol., 1864, p. 15.

² Würtemb. Correspondenzbl., 1844, 10.

Combinations of multilocular cystomata with dermoid cysts are also found. Such cases have been described by Eichwald,¹ Martin,² and Kreis,³ and one has been carefully examined histologically by Flesch.⁴ The opinion of Flesch that the cystoma is gradually transformed into a dermoid cyst can scarcely be entertained. The rarity of the simultaneous occurrence of the two is opposed to this idea, and rather favors the view that it is a pure complication. In the case reported by Pommier,⁵ bilateral dermoid cysts were found, the one on the left side being complicated with carcinoma. Heschl,⁶ too, found carcinoma in the wall of a dermoid cyst.

Symptoms and Course.

Dermoid cysts very often remain stationary, and are then undiscovered during life. In many instances, however, they may rapidly undergo further development from some precise period, so that they grow rapidly, and behave, clinically, just like cystomata.

Sometimes they discharge themselves into neighboring organs, most frequently into the rectum or the bladder. In the latter case atheromatous masses and hair, and even fragments of bone, are found in the urine. (In the case reported by Blick and Winge,⁷ the cyst had apparently grown into the bladder, its contents had been discharged, and its inner wall had become everted, so that it finally formed a polypoid tumor, covered with hair, which projected into the bladder and excited excruciating pain). They may also break through the abdominal wall, and occasionally through the vagina. Perforation into the abdominal cavity is fortunately rare.

Simultaneous rupture into several organs may also take

¹ Würzburger med. Zeitsch., 5, p. 422.

² Berl. klin. Wochenschr., 1872, No. 10.

³ Correspondenzbl. schweiz. Aerzte, 1872, No. 100.

⁴ Verhandl. der physikal-med. Gesellsch. in Würzburg, 1872, B. 3, p. 111.

⁵ L. c., p. 39.

⁶ L. c., p. 58.

⁷ Schmidt's Jahrbuch, 1871, B. 151, p. 294.

place. Larrey¹ saw a case of rupture through the abdominal walls and the bladder; and the case of hydatid pregnancy of the ovary described by Greenhalgh,² in which the cyst communicated with the rectum, bladder, and navel, belongs to this category.

The *diagnosis*, before puncture, can only be that of an ovarian cystoma, since the mode of development as well as the consistency of the growth may be exactly the same as in a cystoma with thick colloid contents.

The *treatment* is also the same as for cystoma. Ovariectomy is indicated in cases of rapid growth.

SOLID TUMORS OF THE OVARY.

Fibroids.

Thomas S. Lee, On Tumors of the Uterus and its Appendages. London, 1847, p. 224.—*Kiowisch*, Klin. Vortr., II., 2. Aufl., 1852, p. 188.—*Rokitansky*, Lehrb. d. pathol. Anat., 3. Aufl., 3. B., p. 423.—*Klob*, Pathol. Anat. d. weibl. Sexualorg., p. 339.—*Virchow*, Geschwülste, III., 1, p. 222.—*Scanzoni*, Krankh. d. weibl. Sexualorg., 2. B., 4. Aufl., 1867, p. 127.—*Ingham*, Amer. Jour. Obstet., VI., p. 106.—*Spencer Wells*, Diseases of the Ovaries, 1872, p. 49.—*Leopold*, Archiv f. Gyn., B. VI., H. 2.

Fibroids are seldom found in the ovary, but they may in exceptional cases attain a very great size. Simpson has a preparation of the kind which weighs fifty-six pounds; and Spiegelberg³ describes a fibroid (probably a fibro-sarcoma) of the ovary which had acquired an enormous volume. The abdomen measured 103 cm. (41 inches) in length, and its greatest circumference was 150 cm. (60 inches), the tumor itself weighing 30 kilogrammes (80 lbs). The tumor was richly supplied with large vessels, running free from the abdominal wall to the tumor, and a vessel as large in size as packing-thread protruded from the wound made by the puncture.

Ovarian fibroids do not develop from a definite point, as uterine fibroids do, so that they do not lie so circumscribed in

¹ Spencer Wells, l. c., p. 65.

² Lancet, Nov. 22, 1870, p. 741.

³ Monatsschr. für Geb., B. 28, p. 415.

the tissue, nor are they so easily enucleated; but they resemble more a uniform hypertrophy of the ovary, in which the configuration and normal relation to the broad ligament are tolerably well preserved. This latter fact is of great importance as a means of distinguishing them from cystomata. The difference in the manner of insertion is best expressed by the schematic illustration made by Leopold. Fig. 116 represents a fibroid,

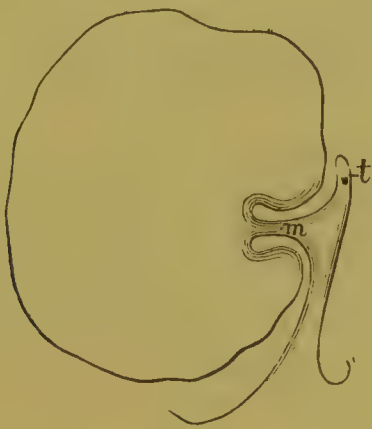


FIG. 116.

Formation of the pedicle in the ovarian fibroid.

t, Fallopian tube; *m*, mesovarium.

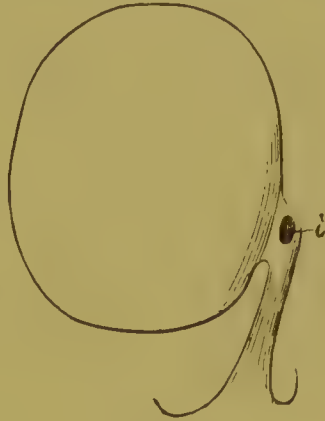


FIG. 117.

Formation of the pedicle in the ovarian cyst.

t, Fallopian tube.

which is connected by a short but broad mesovarium (*m*) with the posterior surface of the broad ligament. The Fallopian tube (*t*), which courses in the broad ligament, retains its normal mobility. In cystomata (Fig. 117), on the other hand, the ovary becomes distended into a round tumor, over which both folds of the broad ligament pass continuously so that the tube lies close to the cyst. While, therefore, the pedicle in the ovarian cyst is formed from the broad ligament itself, in solid tumors it is formed from the short and broad mesovarium, which penetrates into the hylus. Exceptionally, other cysts as well as solid tumors may so grow into the base of the broad ligament that a pedicle is altogether wanting.

In other respects the external appearances of ovarian fibroids do not differ, as a rule, from those of uterine fibroids. It is still doubtful whether only true fibromata occur in the ovary, or myo-fibromata also, since it is extremely difficult to decide, even in the cadaver, whether the fibroid has originated from the

uterus or from the ovary. A fibroid, for instance, which arises from the uterus, may occupy the same position that an ovarian fibroid would, and the ovary may be so atrophied from pressure, or be so closely incorporated with the tumor, that it appears to form a part of it. It is, therefore, still a matter of doubt whether the true myo-fibromata do not always arise from the uterus; the true fibromata alone being of ovarian origin. Virchow considers that myo-fibromata occur in the ovary, but that the smooth muscular fibres are only sparsely found in them.

It is very rare, indeed, that a fibroid appears simultaneously in both ovaries.

Waldeyer¹ saw one case of ovarian fibroid which had a complete osteoid structure; and Kleinwächter² performed Cæsarean section on account of a bony tumor, of which but a small portion was fibrous. Cysts may also occur in the neighborhood of a fibroid, in which case, the fibroid may be said, as a rule, to be complicated with cysts of the Graafian follicle.

Rokitansky and Klob have described the development of small fibroids from a corpus luteum. Jenks³ also has reported a similar case.

The *symptoms* are only such as occur in general from the development of any tumor in the true pelvis, and therefore present nothing essentially characteristic.

In rare instances the fibroma may suppurate. Cases of this kind have been reported by Kiwisch and Safford Lee.⁴ Rokitansky⁵ reported a case of suppuration, after delivery, of a fibroid as large as a goose's egg.

The *diagnosis* can hardly be determined with certainty. The origination of the tumor in the ovary is to be diagnosticated in the manner previously mentioned, yet the differential diagnosis from a uterine fibroid must always be doubtful, as is evident from what has already been said. If it is believed that the tumor arises from the ovary, it can be distinguished from a cys-

¹ Archiv f. Gyn., B. 2, p. 440.

² Archiv f. Gyn., B. 4, p. 171.

³ Amer. Jour. Obstet., VI., p. 107.

⁴ L. c., p. 226.

⁵ L. c., p. 424.

toma by its hardness, its slight mobility, and its gradual growth; and from cancer by its gradual growth and symmetrical surface, and by the circumstance that it can be isolated.

The *prognosis* is more favorable than in other ovarian tumors; for fibroids grow but slowly, as a rule, or may even remain wholly stationary. Ossification also is to be regarded as a favorable termination.

The *treatment* is for the most part purely symptomatic. Ovariectomy, which is more dangerous than in cystomata, is sometimes to be performed, if necessary, on account of the size of the tumor.

Carcinoma of the Ovary.

Förster, Verh. d. Würzburger phys. med. Ges., B. X., p. 24.—*Klob*, Pathol. Anat. d. weibl. Sex., 1864, p. 369.—*Waldeyer*, Arch. f. Gyn., B. I., p. 307.—*Thomas*, Amer. Jour. Obstet., IV., p. 76.—*Spencer Wells*, Diseases of the Ovaries, 1872, p. 54.—*Leopold*, Arch. f. Gyn., B. VI., H. 2.

Etiology.

Primary ovarian carcinoma is very rare, and usually attacks both ovaries (we except secondary cancer, which presents no points of special interest). Moreover, it does not occur with especial frequency in elderly women, but evinces, as it appears, a peculiar predilection for younger subjects, and may even occur before puberty.

Pathological Anatomy.

Carcinoma occurs in the ovary in two different forms. It may appear as a diffuse infiltration of the stroma, so that the entire ovary is transformed into a cancerous mass covered with peritoneum and retaining very nearly the form of the ovary. The ovary, degenerated in this manner, may attain the size of a man's head.

It very rarely happens that one or more cancerous nodules are formed in the otherwise healthy tissue, which grow very large, and thus transform the ovary into a nodular tumor.

In addition, there are also cancrioid forms, which in many cases proceed from the papillary growths of a cystoma; but they

may also occur independently of any such origin. These push their way (without forming adhesions) into the abdominal cavity, and, if they suppurate, may lead to fatal peritonitis. Ovarian carcinoma, in its first origin, is always to be referred to the epithelial constituents of the gland and consequently to the follicles, or at least to the rudiments of follicles.

Since a true cystoma, as a new glandular formation, consists of a proliferation of cells and growth of the stroma through the epithelial cells, it cannot be a matter of surprise that transitional and mixed forms should occur, which may be designated by the term *cystoma carcinomatosum*.

Such cases have been seen by Bruch,¹ Spiegelberg,² and Wagner,³ and, in a bilateral case, in an insane patient, by myself.

Ovarian carcinoma always severely irritates the peritoneum, and thus uniformly occasions marked ascites, and not infrequently limited acute peritonitis. In many cases the chronic peritonitis is well characterized by abundant exudation, extensive thickening, or reticulated tracings on the peritoneum.

The cancer readily encroaches on the neighboring organs, especially in cases of circumscribed nodular formations, and spreads through the pedicle to the pelvic connective tissue or penetrates the mucous epithelium of the ovary, and then grows, fungus-like, into the abdominal cavity.

Symptoms.

In the beginning there are no other symptoms but such as occur in benign enlargements of the ovary. Later, however, the tumor undergoes rapid development, with symptoms of chronic peritonitis; the patient's condition then becomes truly pitiful, until finally death ensues from peritonitis, marasmus, intestinal stricture, etc.

Diagnosis.

At first nothing can be determined save the existence of a hard tumor of the ovary; and the existence of a tumor on both

¹ Zeitschr. f. rat. Medicin, 1849, B. 8, p. 125.

² Monatsschr. f. Geb., B. 14, p. 200.

³ Arch. d. Heilk., V., p. 92.

sides indicates, at most, a cancer rather than a fibroid. Soon, however, the depraved general condition, and the accumulation of fluid in the abdominal cavity, with a disproportionately small tumor, suggest the suspicion of cancer. Œdema of the lower extremities is also one of the earliest symptoms. Further, the tumor is sensitive, and also spontaneously painful. If the tumor increases rapidly in size, while the general condition grows worse and the ascites increases, the diagnosis can hardly be longer doubtful. In the two cases of uncomplicated ovarian cancer which I have seen, it was a characteristic feature that in an evidently ovarian tumor the new growth had progressed from the base of the tumor to the pelvic connective tissue, and thus rendered the tumor immovable.

Treatment.

Although ovariectomy might possibly be indicated in the very commencement, while the diagnosis of malignant disease is not yet certain, the best course to pursue is to simply alleviate the sufferings of the patient as much as possible, as the symptoms call for it, until certain death finally terminates them.

Sarcoma of the Ovary.

Wilks, Pathol. Trans. London, X., p. 146.—*Virchow*, Geschwülste, I. p. 369.—*Hertz*, Virchow's Archiv, B. XXXVI., p. 97.—*Szurminski*, Diss. inaug. Breslau, 1872.—*Lobeck*, Winkel, Berichte u. Studien, etc. Leipzig, 1874, p. 353.—*Beigel*, Krankh. d. weibl. Geschlechts. Erlangen, 1874, p. 440.—*Leopold*, Archiv f. Gyn., B. VI., H. 2.

Sarcoma, which very rarely occurs in the ovaries, and, when it does, appears as a spindle-cell sarcoma, usually affecting both sides, is developed from the connective-tissue stroma of the ovary, which contains small, short, spindle-cells even in its normal condition. The blood-vessels are especially apt to become markedly developed, so that the tumor presents a cavernous appearance. Moreover, the larger Graafian follicles are also apt to increase in size, and may thus occasion a complication of cystic formation with sarcoma. Still more complicated forms of

tumors occur. Thus Spiegelberg¹ has described a cancerous myo-sarcoma²—a sarcomatous degeneration in a stroma consisting of mucous tissue—with distinct epithelial alveoli in certain spots.

The sarcomatous tumor, which, like the fibroid, forms a tolerably uniform hypertrophy of the ovary, may attain a very large volume, although the tumor described by Clemens³ as a medullary sarcoma, and which weighed eighty pounds, hardly belongs to this class.

The course of the disease seems to be tolerably rapid, and the prognosis is as unfavorable as in carcinoma.

The diagnosis is difficult. Rapid growth, early ascites, and sensitiveness merely indicate the malignancy of the tumor, so that the absence of metastases and a somewhat more marked mobility are the only signs of value in distinguishing the growth from carcinoma.

The treatment recommended for carcinoma holds good here; but the prospect of a radical cure may be considered as somewhat better, inasmuch as sarcoma does not so continuously invade the connective tissue.

Papilloma of the Ovary.

Gusserow and Eberth, Virchow's Archiv, B. XLIII., p. 14.—*Klebs*, Handbuch d. pathol. Anat., 4. Aufl., p. 794.

In very rare cases a cauliflower-like, papillary growth, covered with a cylindrical or stratified pavement epithelium, proceeds from the surface of the ovary. In the very interesting case reported by Gusserow and Eberth, the disease had led to extensive ascites, and rupture of the umbilicus, with prolapse of the bowel.

Tuberculosis of the Ovary.

This disease appears to be exceedingly rare,⁴ and has no practical significance.

¹ Monatsschr. f. Geb., B. XXX., p. 380.

² Myxo-sarcoma?—TRANSLATOR'S NOTE.

³ Deutsche Klin., 1873, No. 3.

⁴ *Klob*, Pathol. Anatom. d. weibl. Sex., p. 372, and *Spencer Wells*, l. c., p. 64.

DISEASES OF THE UTERINE LIGAMENTS, AND OF THE ADJACENT PORTIONS OF THE PERITONEUM.

DISEASES OF THE LIGAMENTA ROTUNDA.

Rau, Neue Zeitschr. der G., B. 28, p. 289.

The ligamenta rotunda represent a continuation of the superficial muscular layer of the uterus; hence affections of the latter organ may be imparted to these ligaments very directly.

The round ligaments have a very important diagnostic value in cases of *malformation*, since they always serve as a guide to the boundary between the cornua of the uterus and the Fallopian tubes. When the uterus and tubes are wanting, either upon one or both sides, the round ligaments are also absent.

Moreover, they participate in enlargements of the womb. This is evidenced most strikingly in pregnancy, when they become hypertrophied to large, hard cords, which can be felt at the sides of the uterus—most distinctly in primiparæ, in whom they readily contract.

But it is only the tumors of the ligamenta rotunda which have any real practical importance, inasmuch as it is possible to mistake them for herniæ. This hardly applies, however, to the varices of the round ligaments, though Boivin and Dugès¹ have figured a case where very marked varicosities of both ligamenta rotunda simulated double inguinal hernia.

Hydrocele of the round ligament is much more apt to give rise to mistakes.

HYDROCELE OF THE ROUND LIGAMENT.

Regnoli, Archives génér., 2 série, T. V., 1834.—*Sacchi*, Oesterreich. Jahrb., 1833, B. 14.—*Polant*, Prager Vierteljahrschr., 1845, I., p. 125.—*Bends*, Hosp. Moddelser, B. V., H. 3, 1853.—*Aubenas*, Des tumeurs de la vulve. Thèse. Strasbourg, 1860, p. 44.—*Hart*, Amer. Jour. of Obst., Vol. IV., p. 15.—*Hennig*, Zeitschr. f. Med., Chir. u. Geb., 1868, No. 6.

¹ Atlas, Pl. 32, Fig. 3.

Besides the simple œdematous swelling of the connective tissue surrounding the ligaments, which also is doubtless often described as hydrocele, there are two forms to be distinguished—an extraperitoneal and an intraperitoneal. The former develops in the gubernaculum Hunteri proper (which afterwards in women becomes the ligamentum rotundum), beginning with a new formation of cysts, or, if the gubernaculum is originally a hollow canal, as C. H. Weber claims, the preservation of this canal may be the first step in the development.

The intraperitoneal hydrocele owes its origin to the development of a true processus vaginalis peritonei, which occurs exceptionally in females and extends through the inguinal canal to the mons veneris. In case the canal of this process is obliterated only at the internal inguinal ring, the original intraperitoneal portion of the canal may become a hydrocele. I have myself seen a case in which the serous contents could be emptied into the abdominal cavity, so that, in this case, the communication between the processus vaginalis and the abdominal cavity must have remained open.

Hydrocele has the appearance of a soft, translucent swelling, which may attain the size of a hen's egg, and it has repeatedly been mistaken for hernia and operated upon.

PERIMETRITIS OR PELVEO-PERITONITIS AND PARAMETRITIS.

Grisolle, Archives génér. de med., III. Sér., T. IV., 1839.—*Marchal de Calvi*, Des abcès phlegmoneux intrapelviens, 1844.—*Nonat*, Gaz. des hôp., 1850, No. 25, and 1859, No. 125, and Traité prat. des mal. de l'utérus, etc. Paris, 1860, pp. 232, 710.—*Vulleix*, Union méd., 1853, No. 125.—*Gallard*, Gaz. des hôp., 1855, No. 128, and Annales de Gynécologie, Février, 1874.—*Becquerel*, Maladies de l'utérus. Paris, 1859, T. I., p. 438.—*Bernutz et Goupil*, Archives génér., 1857, Mars-April, I., pp. 285, 419, and Clinique méd., II., p. 1, and *Bernutz*, Archives de Tocologie, Mars, 1874.—*Aran*, Bulletin de thérap., 1859, Juillet-Août, and Leçons cliniques, p. 653.—*Bennet*, On Inflammation of the Uterus. London, 1853, p. 225.—*Peaslee*, Edinburgh, Med. Jour., July, 1855.—*Ch. Bell*, Edinb. Med. Jour., Oct., Dec., 1856, and January, 1857.—*Simpson*, Med. Times, July-August, 1859; Edinb. Monthly Jour., December, 1852; Sci. Obst. Works, 1871, p. 811.—*Matthews Duncan*, A Practical Treatise on Perimetritis and Parametritis. Edinb., 1868.—*Klob*, Wiener Med. Woch., 1862, Nos. 48, 49, and Pathol. Anat. d. weibl. Sex., p. 392.—*Noeggerath*, Die latente Gonorrhoe

im weibl. Geschl. Bonn, 1872.—*Brown*, Amer. Jour. of Med. Sci., July, 1872, p. 56.—*Smith*, Boston Gyn. Jour., Vol. VII., p. 113.—*Aitken*, Edinburgh Obst. Tr., Vol. II., p. 77.—*Spiegelberg* in Volkmann's Samml. klin. Vortr., No. 71.

Concerning the relation of *perimetritis*—inflammation of the pelvic portion of the peritoneum (hence, more properly, pelveo-peritonitis)—to *parametritis*—inflammation of the subperitoneal connective tissue—there have been very diverse opinions. Authors have frequently become so prejudiced in favor of one of these diseases as to deny the existence of the other. The dispute has been most vigorous amongst the French, among whom more particularly Bernutz, Goupil, and Aran contended in favor of pelveo-peritonitis, while Nonat and, in England, Simpson were the advocates of parametritis.

It is not easy to decide the question, because it is difficult to make the diagnosis with absolute certainty in any given case during life, and the opportunities for autopsies in cases of these affections are comparatively rare; and even post-mortem it may be difficult to discriminate between the two diseases, because intraperitoneal exudations may be invested with false membranes, which sometimes acquire a remarkable similarity to the peritoneum.

I am of the opinion—as will be more fully indicated in what follows—that parametritis is a connective-tissue phlegmon, which is due to an infection with septic material; hence, that it is common in the puerperal state, but at other times is tolerably rare, and that perimetritis is a partial peritonitis, which may be, and frequently is, induced by the most diverse causes.

Leaving out entirely the puerperal inflammations, we shall endeavor to describe the two conditions separately, first considering perimetritis, which, in fact, is commoner and of more importance outside the puerperal state, and afterwards taking up parametritis.

PERIMETRITIS, PELVEO-PERITONITIS.

Etiology.

A whole series of causes of the most various description are capable of producing pelveo-peritonitis. Sometimes the disease

springs from a parametritis, through an extension of the inflammation to the peritoneum—a very common event in childbed.

It is especially apt to occur as a complication in a variety of uterine affections. Thus it is particularly liable to be associated with metritis or endometritis. It occurs next in frequency in conjunction with dilatations of the womb, as in hæmatometra and fibroids; further, in connection with displacements, but above all in inversion and prolapse, though it may also be associated with the versions and flexions. Malignant growths of the womb, if far advanced, invariably lead to perimetritis.

Inflammations and enlargements of the ovary are less apt to be accompanied with inflammation of the pelvic peritoneum. Yet the disease is developed invariably after rupture of small ovarian cysts or abscesses, and also when a copious hemorrhage has followed the bursting of veins, or, exceptionally, the rupture of a Graafian follicle. It is a very frequent complication of large ovarian tumors.

Not infrequently perimetritis proceeds from changes in the Fallopian tubes. Enlargements or growths of the tubes may cause it, or an escape of blood from the ostium abdominale; but it is especially apt to be an accompaniment of inflammation of the mucous membrane of the tubes, in consequence of an extension by contiguity of the inflammatory process through the ostium abdominale on to the adjacent peritoneum, or else through the escape at this opening of the products of inflammation—catarrhal secretion or pus. This is often the way in which pelveo-peritonitis is produced in gonorrhœa. Great weight was formerly assigned to this etiology by Bernutz, and recently Noeggerath has given it a special importance. Giles¹ also attributes the frequency of pelveo-peritonitis, together with the benign course it pursues, in prostitutes, to gonorrhœa.²

Noeggerath, of New York, holds that gonorrhœa in men is incurable; that when it is apparently healed it has only become latent, and, in case of marriage, it is invariably communicated to the wife. The latter contracts an inflammation of the mucous membrane, which extends from the entrance of the vagina to the ovaries. Noeggerath follows out this view very closely. He meets the objection, that, con-

¹ Brit. Med. Journal, 1871, p. 539.

² See also *Macdonald*, Edinb. Med. Journ., June, 1873, p. 1086.

sidering the commonness of gonorrhœa in men (eighty per cent., according to him and Ricord), all the wives should be diseased, with the reply: "And they all are diseased. It has come to such a pass that young ladies are afraid to get married, because they know that all of their married acquaintances were made ill directly, and never again recovered." Gonorrhœa in women, according to him, occurs in the form of an acute perimetritis (sometimes puerperal), a recurrent perimetritis or an ovaritis. But the catarrh of the Fallopian tubes plays the most important part in the affection. A sudden escape of but a few drops of the inflammatory secretion (occasioned by a contraction of the tubes) may give rise to any of the various forms of perimetritis, including even the rapidly fatal, acute peritonitis. Sterility, also, is very commonly due to a latent gonorrhœa, and, in the event of conception, abortion, premature delivery, and perimetritis during gestation are exceedingly apt to follow.

Noeggerath's assertions are undoubtedly extravagant, yet we are forced to admit that the chronic inflammatory conditions of the genital organs—the endometritis, metritis, and perimetritis—are only too apt to be the result of gonorrhœal infection.

We should certainly doubt whether catarrh of the Fallopian tubes is an invariable occurrence in gonorrhœa, and hence question its etiological significance with regard to perimetritis. It is our conviction that endometritis often gives rise to metritis, and this again to perimetritis.

Pelvieo-peritonitis may occur also in connection with disorders of menstruation—sometimes with dysmenorrhœa, and sometimes with suppression of the menses. But in suppression the primary occurrence is undoubtedly the acute inflammation of the uterus and its peritoneal covering, and the suppression is merely the first symptom of this affection.

Again, traumatic influences may be the cause of the inflammation of the pelvic peritoneum. Blows upon the abdomen or accidental wounds are occasional, though rare, causes; in the majority of cases the trauma is owing to surgical procedures—particularly bloody operations, the introduction of the sound, or of intra-uterine pessaries, and the like. Coitus also has been assigned as one of the causes of perimetritis; still, in the case of young wives or of prostitutes, the question will arise as to whether the affection may not possibly be due to gonorrhœal infection.

Finally, we must call attention to the fact that chronic inflammation of the pelvic peritoneum may be owing to certain processes which are associated with a chronic peritonitis, but which are entirely independent of the genital system. The most

noticeable of these processes are the tuberculous or carcinomatous new formations in the peritoneum or omentum. With respect to differential diagnosis, these diseases have a very important bearing upon gynecology.

The following table, which shows the etiology in 99 cases of pelveo-peritonitis, is given by Bernutz ; but its value is merely relative :

43 cases of perimetritis occurred in puerpera,

28 after gonorrhœal infection,

20 were menstrual, and

8 traumatic, of which	{	3 were due to excess in venery,
		2 were due to syph. disease of cervix,
		2 were due to introduction of sound,
		1 was due to the vaginal douche.

Pathological Anatomy.

Perimetritis is an inflammation of the pelvic portion of the peritoneum, and may develop under various forms.

In the lighter forms of the inflammation no alterations whatever are left in the parts attacked, or else there remain merely slight deposits or thickenings in the peritoneum.

But the production of pseudo-membranes is very apt to give rise to adhesions between different organs contained in the true pelvis. Very frequently the Fallopian tubes and ovaries are displaced—usually backwards—and become adherent to the uterus or to the peritoneum lining the posterior pelvic wall. Very often, too, adhesions extend from the uterus posteriorly, or from its sides ; they occur less frequently in front of the womb. Furthermore, some portion of the pelvic peritoneum may become attached to organs situated higher up, more particularly the bowel or the omentum.

Sometimes these adhesions are extremely fine and delicate, embracing the organs like a spider's web. In other cases broad, thick pseudo-membranes are produced, which form bridges from one organ to another, or closely invest the uterus and contiguous organs. Where several layers of false membrane are superimposed, one above the other, large quantities of yellowish serum

may collect between them. Something like this occurs when Douglas's cul-de-sac is bridged over and entirely cut off from the general abdominal cavity. Between the separate pseudomembranes, and in the situations where bridges are formed, a thin, yellow serum is secreted, thus practically forming cysts. When such cysts are situated in Douglas's cul-de-sac, and the serum continues to be exuded, they may attain the size of a very large tumor (see Fig. 118). They may be situated elsewhere, however, and then consist usually of rather flat, serous exudations lying between the membranes; though, if the secretion continues, they may afterwards become round and simulate true cysts.

In case the peritonitis is pretty severe, a serous fluid, or a fibrinous and thicker exudation, or in still worse cases a purulent secretion, is poured out into the free cavity of the abdomen.

This exudation collects in the most dependent portion of the peritoneal cavity—in the region of Douglas's cul-de-sac. So long as it remains fluid it acts in the same way as a fold of the intestine in this situation would. When the bladder and rectum are empty (see Fig. 53, p. 160), a large space is left between the posterior wall of the uterus and the anterior wall of the rectum, which is normally filled with coils of the intestine; but if an exudation is present it occupies this space, since it is heavier than the bowel, and the latter therefore floats upon its surface. But so long as the exudation remains fluid it recedes into the general cavity of the abdomen directly the bladder or rectum begins to be distended, and the uterus and rectum approach each other. Hence it is just as impossible to feel a free fluid exudation in Douglas's cul-de-sac, by means of the combined method

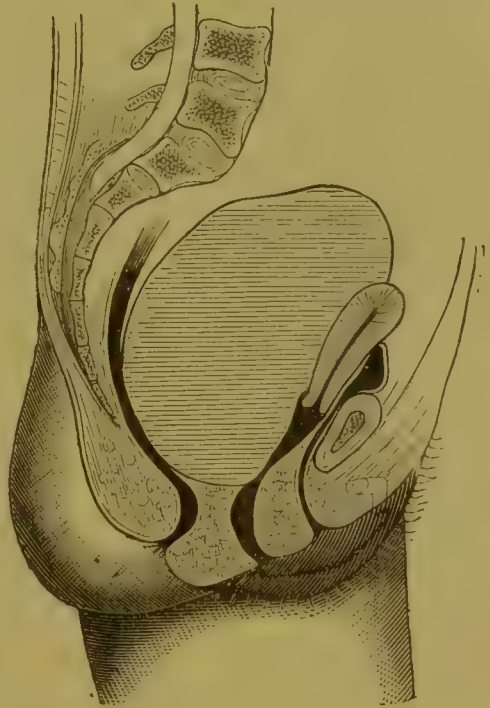


FIG. 118.

Pelvieo-peritonitis serosa of Douglas's cul-de-sac.

of exploration, as it is the empty bowel, for they both recede at once before the exploring finger. Therefore Douglas's cul-de-sac will be filled with the exudation only according as the distention of the bladder and rectum permit. This continues so until the exudation thickens—becomes inspissated or solidified. Then it no longer alters its position, and, inasmuch as it does not recede before the finger, it can be felt (see Fig. 45, p. 98). But the same effect may be produced by a perfectly fluid exudation when it is so enclosed above by false membranes as to be prevented from receding into the rest of the abdominal cavity. In this case, if the fluid continues to be exuded within the enclosed space, another symptom is superadded: since the walls of the cavity in which the exudation is confined are distended equally in all directions, the floor of Douglas's cul-de-sac is forced downwards, the rectum compressed, and the uterus crowded forwards against the symphysis pubis, and a large, elastic, retro-uterine tumor is formed, which strikingly resembles the bloody tumor of hæmatocele (see Fig. 118, p. 449).

In cases where Douglas's cul-de-sac has been obliterated, or when, under any circumstances, in an enclosed space near Douglas's pouch, a certain degree of exudation continues, other portions of the peritoneum may be pushed down before it, since the normal peritoneum yields more readily than the inelastic pseudo-membranes. Under these conditions tumors occur at the sides or in front of the uterus, which extend far downwards, and may have just the situation of exudations of parametritis.

If the exudation arising from the peritonitis is very copious, it may fill the entire lower portion of the abdominal cavity, extending up above the fundus uteri to the bladder, or even to the anterior wall of the abdomen, while the intestines float upon its surface. It may even then become enclosed by false membranes and undergo resorption.

With regard to the ultimate results of the various forms which the products of perimetritis assume, we observe that the simple inflammatory thickenings of the peritoneum as well as the adhesions, as a rule, sustain no further changes; though it appears that the adhesions between different organs may become

thinner and more attenuated, and perhaps in certain instances are entirely reabsorbed.

The yellow serous exudation lying between the pseudo-membranes or in Douglas's cul-de-sac may remain for a long time stationary; extravasations of blood may take place, however, into the collections of serum, or suppuration may occur secondarily. In other cases, after the lapse of a considerable period, complete resorption takes place.

The fibrinous, and also the purulent, exudations generally yield, after the cessation of the inflammatory action, to a more or less complete resorption; yet circumscribed and enclosed deposits of pus may persist for a considerable length of time, or they may eventuate in pelvic abscesses, which in the worst cases undergo decomposition and induce general peritonitis.

As a rule, however, the abscess perforates externally or into internal organs. When it breaks externally, the opening is most usually in the flexure of the thigh, between the external and internal inguinal rings. It may also perforate at the side of the anus, or at the upper and inner part of the thigh, or even through the obturator foramen. In rare instances the abscess is evacuated through the foramen ischiaticum and the glutæi muscles. Very large abscesses may break above the crest of the ilium, or, still higher up, in the back.

Perforation internally takes place most commonly per rectum, next per vaginam, and only occasionally into the urinary bladder. Since the abscess is invested by firm adhesions, which are constantly increasing in thickness, it is rare for the discharge to occur into the abdominal cavity, and when it does, is followed by immediate death or by a subsequently fatal peritonitis. It is extremely uncommon for the abscess to perforate the uterus.

But, furthermore, there may be several openings. Duncan reports a case where the pus opened simultaneously into the bladder and rectum. Simpson¹ saw a recto-vesical fistula—an extremely rare occurrence, of course, in women—which resulted from a double perforation of an abscess. In another case, observed by the same author, a recto-vesical fistula² passed

¹ *Obstet. and Gynecol. Works.* Edinburgh, 1871, p. 812.

² *Ibidem*, p. 816.

through the ovary. Moreover, Simpson reports instances of double perforation, causing vesico-uterine and utero-intestinal fistulæ.

Klob¹ observed a fatty degeneration of the external muscular layer of the uterus, which was a secondary change due to perimetritis, and resembled the fatty degeneration of the cardiac muscle in pericarditis.

Symptoms and Course.

Perimetritis, which is nothing more than a partial peritonitis, may be either acute or chronic.

The *chronic form* develops in connection with a number of affections of the uterus which occasion a long-continued irritation of the peritoneal covering. Thus, it may be associated with hæmatometra, with fibroids, with displacements, with carcinoma, with dysmenorrhœa, as well as with enlargements of the Fallopian tubes and ovaries. Moreover, inflammations of the womb, or the escape of pus or blood through the ostium abdominale of the Fallopian tube is not followed by acute peritonitis always, but a chronic inflammation of the pelvic peritoneum is not infrequently the result. Hence it is that a chronic pelveoperitonitis is very commonly produced after gonorrhœal infection.

Under these circumstances the course of the disease is very protracted. The patient never manifests any marked signs of acute fever, though the date of inception of the disease can usually be fixed with certainty. In some rare cases all symptoms whatsoever—even pronounced abdominal pain—may be wanting; occasionally a frequent desire to micturate is the only symptom of the commencing disease. Much more commonly patients complain of feeling ill from the very start, though perhaps never confined to their beds. Incessant pain in the abdomen harasses them from the beginning of the disease; they are conscious of an inability to apply themselves to any occupation requiring the least exertion; they are annoyed by chronic constipation or persistent diarrhœa. On account of the

¹ L. c., p. 397.

disorders in the intestinal canal, together with the loss of appetite, which is often very marked, they become greatly emaciated.

As in chronic metritis, temporary exacerbations are of very frequent occurrence, and these are often, though not necessarily, connected with the menstrual periods.

The discomfort which the disease occasions is in many cases, however, extraordinarily slight, and even where there are considerable adhesions in the true pelvis it may only amount to occasional pains in the abdomen, which are the most annoying to the patient during muscular exertions which cause an increase in the abdominal pressure and occasion an unusual displacement of the womb.

Coition, too, is often rendered painful by chronic perimetritis. This is partly due to the augmented sensibility from the increased hyperæmia of the parts, but it is chiefly to be ascribed to the traumatic influence—the stretching of the adhesions about the uterus. The traumatic effect is most obvious when the womb is fixed low in the pelvis. Such a case came under my observation where vaginismus was also present, and since the entrance to the vagina was sufficiently capacious, I was obliged to attribute the latter condition to the severe pain excited during coition, the pain proceeding from the uterus.

But not infrequently pelveo-peritonitis develops *in a decidedly acute form*. This is most commonly the case in the puerperal variety, with which, however, we are not here concerned; it is next most frequent in all cases where it occurs as an extension from a primary parametritis, and particularly, therefore, in consequence of certain therapeutic measures, such as injections, the introduction of sponge-tents, sounds, or intra-uterine pessaries, and also after bloody operations. Moreover, perimetritis may occur in connection with endometritis and metritis, and particularly in consequence of the free escape of pus or blood at the abdominal orifice of the Fallopian tube. Consequently it is not so very rare for the acute forms of the inflammation to occur also in gonorrhœa. Perimetritis may occur, too, in consequence of exposure to cold—more particularly at the time of the menstrual period when suppressio mensium usually accompanies it.

The symptoms in these cases are those of an acute partial peritonitis. It commences with a chill or with rigors, or both may be wanting; the temperature rises, the pulse becomes more frequent, and severe spontaneous pains occur over the lower region of the abdomen, together with decided tenderness on pressure. There may be considerable meteorismus, and vomiting also.

On making an examination at the commencement of the acute affection the abdomen is found so sensitive to pressure that it is impossible to employ the combined method of exploration with any satisfaction. The examination per vaginam reveals no other alterations than elevated temperature, swollen mucous membrane and vaginal pulse. The vaginal pulse pertains by no means to any one particular affection (and this fact merits especial attention, for Nonat regards the vaginal pulse as characteristic of phlegmonous tumors); but it is most commonly met with in connection with tumors of the uterus or of the adjacent organs—pregnancy, fibroids, ovarian tumors, etc.—though it is also sometimes present in inflammations of the womb and its appendages—metritis, peri- and parametritis.

The course pursued by the acute pelveo-peritonitis is subject to the following variations: Not very infrequently the inflammation extends to the whole peritoneum, and then we have all the effects of a general peritonitis, and consequently the issue is most commonly fatal. But the inflammatory action may be limited, and merely such changes are left as are induced by the inflammation; or the disease lapses into chronic inflammatory processes, which are very persistent, and not infrequently are associated with relapses of the acute inflammation.

After the acute period of pelveo-peritonitis has expired, or where the course of the affection is chronic from the commencement, an examination will afford very interesting results, which will be of great variety, depending upon the changes which have taken place.

If the adhesions and pseudo-membranes are not very dense they cannot be distinctly felt, though their presence may be clearly evinced in their effects. This is especially the case when organs accessible to the touch in the true pelvis, which are other-

wise movable, become fixed in one position, as is the case with the uterus most commonly, though the ovaries may also be so affected. Another effect of the adhesions, which can be detected by palpation, is produced when organs which are ordinarily inaccessible to the touch, because they recede at once before the exploring finger (such as the folds of the intestine and also the omentum), are bound down in one position, so that they can be palpated. We then feel high up in the pelvic strait an indistinct resistance, a diffuse, soft tumor, whose exact situation and size cannot be accurately estimated. The consistence of the tumor varies considerably, according to the degree of distention of the bowel. If the latter contains only gas, a very indistinct resistance is perceptible; although no tumor can be detected in the combined method of exploration, the fingers cannot be brought so nearly together as usual. But if the firmly adherent coils of the intestine are filled with fecal matter, diffuse tumefactions are felt, the precise size and limits of which cannot be well determined by palpation. These tumors, which are formed by the bowel when adherent to the genital organs, should be thoroughly understood, for they are exceedingly characteristic. The bowel can be felt under these circumstances, because the adhesions bind it firmly to the genitals; otherwise it would recede before the finger.

Serous transudations between pseudo-membranes can be felt the same as the real exudations.

The latter, as already pointed out above, cannot be felt as a distinct tumor so long as they remain fluid, any more than we can define by palpation a free dropsical effusion in the peritoneal cavity, because the free fluid immediately yields to the palpating finger. But the case is altered so soon as the exudation is prevented from receding through its becoming solidified, or through its enclosure in a capsule of false membrane. Directly this has taken place, we are enabled by means of the combined method of exploration to detect a well-marked tumor, the size, location, and boundaries of which may be accurately ascertained. In the great majority of cases intraperitoneal exudations are found in Douglas's cul-de-sac, since this situation, both in the erect and recumbent postures, forms the most dependent part of the abdom-

inal cavity, into which the fluid therefore naturally flows. Here, after it has stiffened or become enclosed in a membranous capsule, it forms a retro-uterine tumor of varying size, and in case the exudation is continued within the enclosed cavity, it may attain an enormous magnitude (see Fig. 118).

In cases where Douglas's cul-de-sac has previously been obliterated, or when under any circumstances membranous cavities form in other situations, we may have intraperitoneal tumors situated at one side of the uterus. The exudations then are always situated high up at first, where they are inaccessible to an exploration through the vagina only, and sometimes they lie above the true pelvis, or laterally in the iliac fossa. As a rule, they are not very large, and are rather flat. But when there is a continued exudation in such an enclosed space at the side of the uterus, the tumor increases in size, crowds the ligamentum latum either forwards or backwards, and presses the peritoneum which forms the floor of the cavity downwards. In this way tumors are formed which may project far downward along the side of the uterus into the true pelvis, having all the appearance of exudations due to parametritis. In fact, they may be taken for the latter in the cadaver even, since the false membrane may be mistaken for peritoneum, and the small portion of the peritoneum, which has been forced downward and become altered in its appearance, may be regarded as the newly formed wall of the abscess. The excavatio vesico-uterina is very rarely protruded downward in this way.

Perimetritis with exudation may *vary also in its ultimate results*. Entire resorption of the intraperitoneal adhesions and exudations is, to say the least, rare. In all cases the pelvic organs remain attached to each other, causing permanent displacement, or the organs contained in the true pelvis remain immovably fixed in permanent positions. Occasionally, however, the adhesions become attenuated, or are so stretched by the continued traction that the displacement is gradually overcome and an almost normal mobility is recovered.

A common effect of perimetritis is sterility. The direct causes of it are contraction or occlusion of the Fallopian tubes, the enclosure of the ovaries in exudations, and also displace-

ments of the womb. Should conception occur, the adhesions, even though very dense and firm, will gradually yield to the slowly enlarging uterus. In very rare cases only, when the adhesions are perfectly rigid, the womb is prevented from enlarging, and abortion results.

The effect of the adhesions upon the position of the uterus is generally shown in a lateral displacement, in which position it is often immovably fixed; though in many cases the gradual stretching of the adhesions—seldom, probably, a total separation—enables the uterus to resume its former perfect mobility.

After the exudations have been entirely reabsorbed, the same effects are left as are produced by the adhesions, for in the former case, also, the only result is that the organs implicated remain bound together. The exudation may, however, remain for years unchanged, after its fluid portions have been removed, the absorbent action leaving the solid parts unaffected. In still other cases supuration takes place, and the abscess leads to the various issues described above.

The intraperitoneal exudations, though as a rule they do not attain any very considerable magnitude, may exceptionally be of very great bulk; but, in contradistinction to the exudations of parametritis, they do not crowd the uterus to the opposite side, but fill out the lower portion of the abdominal cavity so evenly—since they are at first fluid and only gradually thicken—that the upper portion of the true pelvis seems as though it were entirely occupied by a hard, solid mass. The exudation extends up the pelvic walls on all sides, and

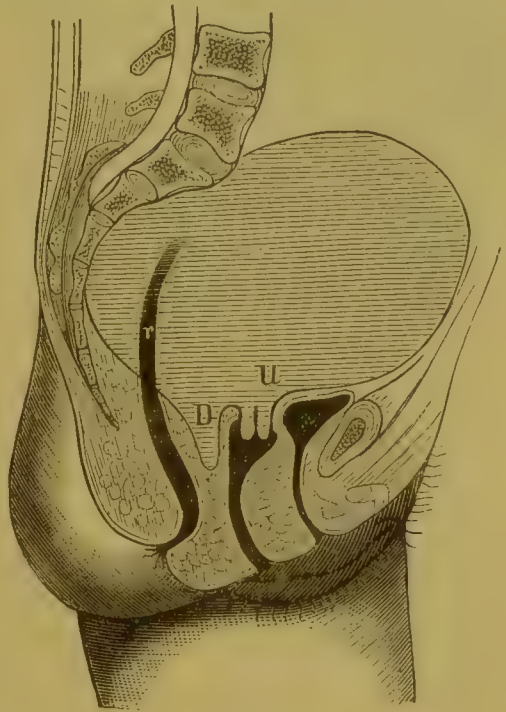


FIG. 119.

Large intraperitoneal exudation, which in the lowest portion of the abdominal cavity has solidified.

u, uterus, the location and size of which cannot be made out; *D*, Douglas's space, filled up with exudation; *r*, rectum, which lies in the centre of the exudation.

so surrounds the uterus that it can no longer be separately felt, and the whole pelvic entrance is so occupied that only a narrow opening in the rigid mass is left for the rectum (see Fig. 119).

We would call attention particularly to the fact that in cases where the perimetritis has originated in an extension of the inflammation from the pelvic connective tissue, intra- and extra-peritoneal exudations frequently occur together.

Diagnosis.

It is generally easy to diagnosticate perimetritis, since, when the inflammation is recent, the tenderness on pressure, which is either diffused over the lower portion of the abdomen or confined to one spot, constitutes a sure sign of inflammation of the peritoneum.

After the acute inflammation has subsided, the tenderness still remains for some time, and this, in connection with subsequent results of the inflammation, will suffice to indicate the diagnosis.

The presence of the ordinary adhesions may be recognized by the marked immobility of the uterus or of one ovary; the stronger adhesions can frequently be felt as bands which are sensitive to the touch.

It is more difficult to diagnosticate an adhesion of the intestines to the genital organs. This condition is most liable to be mistaken for simple fecal accumulations in the bowel, since they also may render the intestine immobile and thus simulate tumors. The adhesion may be inferred from the local tenderness and from the extreme hardness which remains after the bowel has been wholly evacuated.

With regard to the effects produced by exudations, we have already spoken of them at sufficient length in describing the symptoms. They are so characteristic that they can be confounded with those of few other tumors. The tenderness with which exudations are accompanied, their lack of, or at least imperfect, mobility, and their rather irregular shape, are generally sufficient to render them quite unmistakable. Very old exudations only, which have lost their sensitiveness, have par-

tially recovered their mobility, and are occasionally attached to the uterus by a sort of pedicle, may be confounded with fibroids or ovarian tumors. It is possible to distinguish them, not only by taking into account the history of the case, but by means of the irregular shape of the former, and also by their greater consistence, which even surpasses that of the fibroids, old exudations often becoming as hard as a board.

We shall speak of the differential diagnosis between retro-uterine exudations and hæmatocele retro-uterina when we come to speak of the latter affection.

It may be exceedingly difficult sometimes to decide the question whether the exudation is intra- or extraperitoneal,—in other words, whether it is a peri- or a parametritis. Ordinarily, to be sure, the points of distinction between these tumors are sufficiently characteristic. In parametritis the tumor can be easily reached by the vagina, unless it is situated in the fossa iliaca; and moreover, it is on one side, either in close proximity to the lateral border of the uterus, or separated from it by a distinct furrow. Very rarely is the tumor in front of or behind the womb. In perimetritis the tumors, as a rule, are retro-uterine, and may then, like those of the other variety, protrude far down into the vagina. When they are situated laterally they are usually so high up that it is impossible to reach them from the vagina.

But, as pointed out above, an intraperitoneal exudation which is enclosed in a membranous capsule may carry the peritoneum far downwards and protrude into the vagina, and, under these circumstances, may produce precisely the effect, so far as position and size are concerned, as the extraperitoneal exudations. Moreover, after suppuration has taken place, the question as to whether the abscess when it first developed was intra- or extraperitoneal, is often a matter of considerable doubt. The difficulty of making the differential diagnosis is also increased from the fact that in primary peritonitis the peritoneum may lie in the centre of the exudation—an exudation of perimetritis lying above and an exudation of parametritis below.

If, on puncturing an elastic pelvic exudation, a stream of

thin serum is obtained, the exudation invariably pertains to perimetritis.

Prognosis.

Inasmuch as perimetritis may lead to a general peritonitis, it is always a dangerous affection. The danger is most imminent in the acute form. But also chronic perimetritis, which is not apt to become general, may yet, in consequence of the adhesions being torn, or from the resulting hemorrhage, be followed exceptionally by a general inflammation.

The hemorrhages from the adhesions may occasionally give rise to hæmatocele.

Furthermore, perimetritis may be the cause of displacement of the pelvic organs, and thereby of dysmenorrhœa and sterility, together with the rest of the ordinary symptoms and consequences of displacements of the uterus.

Laceration and stenosis of the bowel, with the consequences, may be caused by the adhesions attached to the intestine.

The abscesses also may be attended with serious dangers; not so much on account of the rare occurrence of a perforation into the abdominal cavity, as because of the liability that the inflammatory action in the abscess may lead at any moment to a general peritonitis. The latter may be owing to a perforation into the bowel, which permits the escape of fæces and intestinal gas into the cavity of the abscess, as illustrated in two cases observed by Duncan; this is, however, contrary to the view maintained by Dupuytren.

Treatment.

Concerning the prophylactic treatment, which consists in avoiding all of the causes of perimetritis detailed above, it is unnecessary to speak further.

The acute perimetritis is to be treated as a partial peritonitis, in the usual strictly antiphlogistic manner: internally, opium to keep the bowels quiet, ice-bags upon the abdomen, and, in case of severe pain, leeches in the groins.

If this treatment controls the inflammation, and the fever

subsides, it is only necessary—beside providing for free defecation, which may be done by means of enemata or mild aperients—that perfect rest be enjoined.

If in chronic perimetritis there is considerable sensitiveness, we shall find that, even where the complication of chronic metritis is wanting, relief will be afforded by scarifications of the vaginal portion of the cervix. Moreover, warmth and moisture—the so-called fomentations of Priessnitz applied to the abdomen, together with lukewarm hip-baths at a temperature of 95° F.—are often surprising alleviatives.

If the condition has become very chronic, it may be still possible to effect a tolerably complete resorption by means of the above fomentations (which should be employed for a long period and be allowed to remain on during the night), by the use of somewhat warmer hip-baths [increase the temperature cautiously !] and by the iodide of potassium. At the same time it is of great importance to prevent any long-continued overloading of the bowels.

Even very old exudations, which have persisted without change for years, are not unfrequently made to undergo by this treatment, to say the least, a partial resorption ; or, if not, they may yield to the stimulated absorbent action excited by the mud-baths, especially those which contain iodine and bromine—such as the baths at Kreuznach and Münster on the Stein ; at Tölz ; at Hall, in Upper Austria ; at Sodenthal, near Aschaffenburg, etc.

The abscesses should only be opened when they cause a marked protrusion. They are slow to heal, since the walls of the enclosed intraperitoneal cavity are often rigid, on account of the false membranes, and come together with difficulty, the purulent secretion continuing for a long time.

When the abscess has perforated the bowel, the discharge may last for years, the narrow communication with the intestine only closing temporarily. So soon as the cavity of the abscess begins to be distended with pus, the opening is made pervious again, and from time to time repeated discharges of pus take place into the bowel.

PARAMETRITIS.

Etiology.

As already stated above, I regard parametritis—the “pelvic cellulitis” of the English—as a phlegmon of the pelvic connective tissue, which is invariably the secondary effect of the resorption of septic matters. For this reason parametritis is of pretty rare occurrence, excepting in the puerperal state. Aside from this, it is most common after traumatic operations upon the vagina or cervix. Thus all cutting operations, as well as the dilatation of the cervix with sponge-tents (which abrade the mucous membrane and expose it to the danger of absorbing the foul secretions), may lead to parametritis. Generally speaking, it is liable to occur in all cases where the epithelium is destroyed and septic matter is brought into contact with the exposed subjacent connective tissue.

Purely traumatic operations, in which there is no infection of the wounds, give rise, not to parametritis, but to perimetritis.

Pathological Anatomy.

Parametritis is a phlegmon (the acute purulent œdema of Pirogoff) in the connective tissue of the pelvis. It occurs more particularly about the upper portion of the vagina, between the layers of the broad ligaments, and thence extends upwards into the fossæ iliacæ, and posteriorly as far up as the kidneys. Exudations between the uterus and bladder, or between the bladder and anterior wall of the abdomen, are met with rarely; neither is the phlegmon apt to extend to the short, unyielding connective tissue which unites the peritoneum with the body of the uterus.

In the phlegmonous process the connective tissue becomes infiltrated with a gelatinous, fibrinous exudation which is also more or less cellular in its composition. In exceptional cases the pus corpuscles may be so numerous as to flow together and form an abscess.

Parametritic abscesses have, in general, the same ultimate

results as those due to perimetritis—in fact, after suppuration has taken place it is generally too late to decide whether the disease is owing to an intra- or an extraperitoneal process; nor is it practically very important, since the perimetritic abscesses are also shut off from the general cavity of the peritoneum by firm investing membranes. It appears as though abscesses of parametritis were more apt to perforate externally in the groin, while those of perimetritis, into the internal organs.

Freund¹ has described, under the name of *parametritis chronica atrophicans*, a peculiar form of chronic parametritis, which he supposes, in many instances, constitutes the anatomical basis of hysteria, and which he is very particular to distinguish from the puerperal parametritis. In this affection an inflammatory hyperplasia of the pelvic connective tissue takes place, the consequence of which is a cicatricial shrinking of the tissue. On account of the compression to which the veins are subjected, disorders of the circulation occur, and the final result is a high degree of atrophy of the pelvic connective tissue, as well as of the entire genital tract; in this way such a condition of the genitals is produced in women not much over thirty as we ordinarily find only in women who have passed the age of fifty.

The symptoms of the affection consist of pains in the deeper region of the pelvis, tedium coitus, and, above all, hysterical manifestations.

With respect to the etiology, Freund regards the disease as attributable to over-irritation of the genital nerves, with excessive losses of secretion.

Symptoms and Course.

Parametritis is almost invariably acute, resembling in the mode of its development the acute form of pelveo-peritonitis. It is frequently accompanied with exudation.

The disease begins with a sudden attack of fever (occasionally with a chill), and its further course is marked by a high temperature, and increased frequency of the pulse.

In very rare cases the inception of the disease is not distinctly marked. There is a feeling of discomfort, with languor, loss of appetite and pains in the pelvis, and, on making an examination, the exudation is discovered.

The pain is owing to the implication, or at least to the associated irritation, of the peritoneum. Not infrequently pains

¹ Monatsschr. f. Geb., B. 34, p. 380, and Verh. der Rostocker Naturforscherversam., 1871, p. 63.

occur in one lower extremity, in consequence of the pressure of the exudation upon the nerves; occasionally there is an enforced position of flexion or adduction of the thigh, which is characteristic; furthermore, pains in the lower part of the back, pain during defecation, and disorders connected with the bladder, are frequent symptoms of the pelvic tumor.

Upon examination an exudation is found, which is situated on one side of the uterus, either in close proximity to it, as though projecting from its lateral margin, but usually separated by a well-marked furrow, or else somewhat removed from it; and not infrequently it extends up into the iliac fossa. If the infiltration is only slight in amount, and merges gradually into sound connective tissue, simply a diffuse resistance can be detected, which is situated at one side of the womb. But if the infiltration is more considerable, and the process has become circumscribed, we find a well-defined tumor, which, as a rule, can be distinctly felt from the vagina, and sometimes it pushes the roof of the vagina on one side down before it. Frequently only one side is affected, though not very rarely the disease occurs on both sides. The tumor is movable only when it is perfectly circumscribed, and lies quite close to the uterus, and even then it is but slightly so, and can only be moved in conjunction with the womb, as though it formed a sort of appendage to it.

The size and extent of the tumor are extremely variable. Sometimes only a slight tumefaction is found in the ligamentum latum, or exceedingly small sensitive deposits, like tubercles, occur at the side of the womb. But in other cases the whole upper portion of the pelvis seems to be filled up with the exudation.

The consistence of the tumor is, at first—while it is still very sensitive—pretty soft. It becomes tender after the acute process has subsided, and finally, after it has become perfectly inspissated, it may become as rigid and hard as a board. When an abscess forms, the region becomes sensitive again and somewhat soft, as though œdematous, until the whole mass has suppurated, when the entire tumor becomes elastic or fluctuates.

The characteristic location for the exudation of parametritis

is on one side, as described above. In very rare cases, and where the exudation is slight in amount, its seat may be in the retro-uterine connective tissue, which lies between the cervix and upper portion of the posterior wall of the vagina, on the one hand, and the floor of Douglas's cul-de-sac on the other. Still more rarely is the tumor of parametritis found beneath the excavatio vesico-uterina, or underneath the place where the peritoneum is reflected from the bladder on to the anterior wall of the abdomen.

The further course of the affection is, in the majority of cases, chronic; the inflammatory process becomes limited, and the exudation becomes inspissated and gradually undergoes resorption. Yet there is always the danger that the inflammation may extend to the peritoneum lying over the affected connective tissue, and so a general peritonitis ensue. In case the infection has been exceedingly severe, the result may be a necrosis of the inflamed connective tissue.

But, as a rule, the inflammation becomes limited, the fever subsides, the painfulness diminishes, and the hitherto soft, somewhat ill-defined exudation becomes hardened, and assumes definite limits. Under these circumstances the usual result is that the tumor is gradually reabsorbed, the process being accompanied, in the larger exudations, with well-marked hectic fever, and finally the tumor disappears entirely. In other cases the exudation remains stationary, and a large solidified tumor of great hardness continues for some time to occupy the cavity of the pelvis; nevertheless, a partial resorption may occur at a very late period.

If an abscess is developed, the tumor begins to increase in size again, and its former sensitiveness returns, while, meantime, there is a renewed occurrence of the remittent fever. These symptoms continue until the abscess has perforated externally, or into the cavity of some hollow organ.

The position of the uterus may be altered in various ways. In the case of the large exudations the womb is crowded to the opposite side; later, as resorption proceeds, it is gradually drawn over to the side of the exudation, and for a time is held firmly in this position, until by degrees its normal position is resumed, and its former mobility returns.

Diagnosis.

Parametritis can only be diagnosticated through the presence of an exudation, for the tenderness proceeds from the peritoneum, which lies above the inflamed connective tissue.

The diagnosis of an inflammatory exudation is not generally difficult, yet it may be a matter of great difficulty to decide the question as to whether the exudation is intra- or extraperitoneal. We have already referred to this at some length in connection with the diagnosis of perimetritis.

But aside from this, the exudations of parametritis are most liable to be confounded with uterine fibroids; but the fact that the former are not, as a rule, round, but rather flat, the mode of their inception, their tenderness and lack of mobility will suffice to distinguish them. Moreover, there is a difference in their consistence, for the exudations, in the beginning and also after suppuration has taken place, are softer than the fibroids, but when they have become solidified they are much harder than the latter. They also present characteristic marks of distinction in the courses which they pursue. The exudations gradually grow harder and smaller, or if they increase in size, it is only in connection with febrile symptoms and increased sensitiveness, and even then they do not increase in size so gradually nor so uniformly as the fibroids. But where a fibroid, which is situated low down, becomes inflamed, the diagnosis may be rendered extremely difficult.

The exudations are still less liable to be confounded with ovarian tumors, on account of the lower positions in which the former occur, their immobility and their different consistence (unless in the stage of suppuration). But, on the other hand, if the ovarian tumor is confined in one position, low down, at one side of the uterus, and there becomes inflamed, the diagnosis will be difficult.

An exudation may be distinguished from an extra-uterine pregnancy, which occasionally has a similar location, by observing the subsequent course.

Prognosis.

Parametritis is not of itself a disease which threatens life, yet on account of the infection which causes it, we can never be sure that an extension of the disease to the peritoneum, or some other consequence of the infection, may not lead to a fatal termination.

But after the inflammation has become limited, the prognosis is decidedly favorable, for if appropriate means are employed resorption invariably takes place, and we may anticipate a perfect *restitutio in integrum*.

Treatment.

With regard to prophylaxis, we here simply observe that it consists in the avoidance of infection.

A recent parametritis—so long as the process has not extended to the peritoneum—demands hardly anything more than rest. Mild aperients are indicated to keep the bowels open. Great relief is obtained by the application, over the abdomen, of the so-called fomentations of Priessnitz.

If the tenderness is gone, and the tumor has become hard, resorption may be stimulated by means of hip-baths, with warm water or with the mother-water of Kreuznach, and by the internal use of the iodide of potassium. By these means, or through a course of treatment in the iodine or bromine mud-baths, extensive and old exudations may frequently be compelled to yield to a complete, or at least to a partial resorption. The English recommend especially the good effects derived from the external application of blisters.

If suppuration has commenced, it is unnecessary to take any pains to find the pus, since the abscess is not apt to perforate into the abdominal cavity, but generally breaks at some favorable point. As a rule, the abscess need not be evacuated until it can be reached without incurring any great danger or difficulty.

RETRO-UTERINE HÆMATOCELE.

Viguès (Nélaton), Des tumeurs sanguines, etc. Thèse. Paris, 1850.—*Nélaton*, Gaz. des hôp., 1851, No. 16, and Nos. 143-145; 1852, Nos. 12 and 16, and 1853, No.

100.—*Fénerly*, De l'hématocèle rétro-utérine. Thèse. Paris, 1855.—*Laugier*, Gaz. des hôp., 1855, No. 27.—*Gallard*, Union méd., No. 134, 1855, and Archives génér., Oct.—Dec., 1860.—*Gallard* etc., Bulletin de la soc. anatom. de Paris, Avril, 1858, p. 157.—*A. Voisin*, De l'hématocèle rétro-utérine. Thèse. Paris, 1858. Trans. into German by Langenbeck. Göttingen, 1862.—*Bernutz et Goupil*, Clinique méd., T. I. Paris, 1860.—*Trousseau*, L'Union méd., 1861, Nos. 153–155.—*Engelhardt*, De l'hématocèle rétro-utérine. Thèse. Strasbourg, 1856.—*Puech*, Journal de Bruxelles, XXXI., p. 44, Juillet–Nov., 1860.—*Dolbeau*, Med. Times, Febr. and March, 1873.—*M. Duncan*, Edinb. Med. J., 1862.—*Tuckwell*, On Effusion of Blood in the Neighbourhood of the Uterus, etc. Oxford and London, 1863.—*Barnes*, St. Thomas's Hospital Reports, 1870.—*Meadows*, London Obst. Tr., XIII., p. 140, and p. 170, and Amer. J. of Obst., Vol. VI., 1874, p. 659.—*Snow-Beck*, London Obst. Tr., XIV., p. 260.—*Lee*, Amer. J. of Obst., Vol. VI., p. 193.—*Credé*, M. f. Geb., B. 9, p. 1.—*Ott*, Die periuterinen und retrovag. Blutergüsse. Diss. inaug. Tübingen, 1864.—*Breslau*, Schweiz. Z. f. Heilk., 1863, B., II., p. 297.—*Ferber*, Schmidt's Jahrb., 1864, B. 123, p. 223, B. 135, p. 321, and 1870, B. 145, p. 39.—*Roedelheimer*, Würtemb. Correspondenzbl., 1867, Nos. 12, 13.—*Schröder*, Krits. Unters. über d. Diagn. d. Haemat. retr., etc. Bonn, 1866, and Berl. klin. Woch., 1868, No. 4, etc.—*Olshausen*, Arch. f. Gyn., B. I., p. 24.—*Küchenmeister*, Prager med. Viertelj., 1870, B. I., p. 31, B. II., p. 45.—*Weber*, Berl. klin. Woch., 1873, No. 1.—*Fränkel*, Prager Viertelj., 1872, 4, p. 46.

Definition and Mode of Occurrence.

Nélaton, who in 1850 first described hæmatocele as a special form of disease, defined it as the formation of a tense, bloody tumor in Douglas's cul-de-sac, which crowded the uterus against the symphysis pubis. Subsequently the term was given a more general signification, and every bloody tumor in the pelvis was designated as an hæmatocele; in fact, the application was so enlarged as to embrace all hemorrhages into the abdominal cavity (Barnes, for instance, applied the term to hemorrhages due to rupture of the uterus) under the name of intraperitoneal hæmatocele. But so general a use of the term hæmatocele must of necessity detract from a clear apprehension of the different diseases thereby designated; for what resemblance is there between the hæmatocele of Nélaton and a free hemorrhage into the abdominal cavity, which causes immediate death! Now, since Nélaton's bloody tumor represents a special, well-defined form of disease, which has a great practical importance of its

own, it is absolutely necessary, in order to prevent a complete confusion of terms, to retain the above definition of hæmatocele retro-uterina intraperitonealis: a bloody tumor situated in Douglas's cul-de-sac, which crowds the uterus forwards. We will here remark that in order to distinguish them we shall designate all extra-peritoneal hemorrhages as thrombi or hæmatomata.

Hæmatocele is not apt to occur in women who have previously been perfectly healthy; the great majority of them have had children and have suffered from puerperal diseases, especially perimetritis. Moreover, disorders of menstruation have very frequently preceded the hemorrhage. The bloody tumor is most common during the period of greatest sexual activity—from the ages of twenty-five to thirty-five approximately.

We shall not here discuss the particular causes of the hemorrhage, since it is necessary first to become acquainted with the pathological anatomy, and, more particularly, with the sources from which the hemorrhages may proceed.

There exists a great diversity of opinion among gynecologists as regards the frequency of hæmatocele, and this in itself is an evidence of the difficulty of the diagnosis. It is my own opinion that hæmatocele is a disease of pretty rare occurrence, and while Scanzoni's statement, that he has seen only two cases in a practice of twenty years, is certainly very remarkable, I am fully convinced that, on the other hand, such statements as that made by Seyfert—that the relative frequency of hæmatocele is to be reckoned at five per cent. of all diseases—and that of Olshausen (who puts the ratio at four per cent.) are, in a measure, founded upon erroneous diagnoses. According to my own experience, including those cases where only certain conditions were found which in all probability had resulted from pre-existing hæmatoceles, this affection constitutes about 0.7 per cent. of all diseases—that is, seven cases of hæmatocele occur in every thousand patients.

Pathological Anatomy.

Hæmatocele intraperitonealis consists almost invariably of a retro-uterine, enclosed tumor, situated in Douglas's cul-de-sac.

It is necessary to the definition of hæmatocele that the tumor should be shut off from the rest of the abdominal cavity, for free hemorrhages into the cavity of the peritoneum never cause a tense, elastic tumor, which is capable of crowding the uterus forwards; but when blood escapes into the free cavity of the abdomen, it forms simply a pool of blood in the most dependent portion of the abdominal cavity, which may, however, afterwards become enclosed in an inflammatory, newly formed, membranous capsule.

The tense, elastic tumor which crowds the uterus forwards may occur in two ways.

1. It may be developed where a pseudo-membranous cavity, shut off from the general cavity of the peritoneum, existed prior to the hemorrhage—that is, a cavity whose walls lie in contact with each other (the same as we speak of the pleural cavity, for instance). While the posterior wall of the uterus and the anterior wall of the rectum lie in close relation to each other, Douglas's cul-de-sac becomes bridged over above. Now, in case a hemorrhage occurs from some place situated below this membranous bridge, the blood is effused into the enclosed space, distends its walls, and so forms a tense tumor which crowds the uterus forwards. Here belong, also, those cases where the hemorrhage takes place into a previously existing retro-uterine tumor with fluid contents. The tumor then, all at once, becomes greatly distended, and its contents are changed to a mixture of serum, or pus, and blood.

2. But hæmatocele may also develop in cases where Douglas's cul-de-sac is not enclosed by membranes at the time the hemorrhage occurs. In all such cases, no matter whence the blood is derived, the tumor is not tense at first, and does not press the uterus forwards, but it merely forms a pool of blood in the most dependent portion of the abdominal cavity, the folds of the bowel floating upon its surface. The pool of blood changes with every change in the patient's position, though it always fills the region of Douglas's cul-de-sac, since both in the erect and recumbent posture this forms the most dependent part. But so long as the blood remains fluid it only occupies Douglas's cul-de-sac in the same manner as the folds of the intestine,

that is, it is only when the bladder and rectum are empty, and the posterior wall of the uterus and anterior wall of the rectum are separated from each other, that any considerable amount of blood can descend between these organs; but as soon as the bladder and rectum begin to fill, and the capacity of Douglas's space is diminished, the fluid blood recedes, partly or almost entirely, into the rest of the abdominal cavity. It acts in the same way also when a digital examination is made. The fluid blood cannot be felt as a tumor any more than it is possible to feel the bowel when lying free in Douglas's cul-de-sac.

If the blood has coagulated or become enclosed in pseudo-membranes, though it forms a perceptible retro-uterine tumor, it still lacks the characteristic features of an hæmatocele. The tumor will be of considerable size if, at the time when it became firm, the bladder and rectum were nearly empty, while if these organs were then full, merely a thin layer of blood will separate the uterus from the rectum.

This bloody tumor is distinguished from true hæmatocele in that its walls are not tense, that it does not crowd the uterus forwards, and that it only occupies so much of the true pelvis as the condition of the organs there permits. Therefore, the chief symptoms of hæmatocele are wanting, viz., those which depend upon the effects produced by the pressure of the tumor upon the organs of the true pelvis.

True hæmatocele is produced by a free hemorrhage into the cavity of the abdomen only *when the blood is derived from some spot deeply situated, and when the hemorrhage is either slowly continued or repeated at intervals.*

A single hemorrhage, if it occurs in the free cavity of the



FIG. 120.

Hæmatocele retrouterina intraperitonealis.

H, The bloody tumor.

peritoneum, can never present the features of hæmatocele, for the reason given above; but when the effused blood is inclosed afterwards in a membranous capsule, which forms, in consequence of the irritation excited in the peritoneum by the bloody effusion, and the hemorrhage then still continues, or is repeated, the new hemorrhage does not take place into the free cavity of the abdomen, if it proceeds from a place which is situated below the membranous investment, but into the enclosed cul-de-sac of Douglas. Hence the conditions are now just the same as in the case where Douglas's cul-de-sac is shut off primarily. The blood extravasated from the vessels distends the newly formed investing membrane, compresses the rectum, causes the floor of Douglas's cul-de-sac to protrude downwards, and crowds the uterus against the symphysis.

But if, on the contrary, the hemorrhage occurs from some spot lying above the investing false membrane, no hæmatocele is formed, but only a second pool of blood, which lies above the first, the latter having already been enclosed in a membranous capsule. It is this requirement that the source of the hemorrhage should lie below the fundus uteri, which alone confers upon hæmatocele the right to be ranked among the gynecological diseases, for then the hemorrhage must proceed from some of the organs of the true pelvis.

Only in exceptional cases (particularly in prolapse of the womb) is the first hemorrhage ever so considerable in amount that the pool of blood rises above the fundus uteri; then the adhesive peritonitis, which encloses the blood in pseudo-membrane, occurs above the fundus, and extends on to the bladder, or as far as the anterior wall of the abdomen. If the hemorrhage is continued, or is repeated after the investment has taken place, a hæmatocele results which reaches above the uterus as far as the anterior abdominal wall.¹

Let us now consider somewhat in detail *the sources from which the blood, of which the hæmatocele consists, may be derived*. As we have already seen, the hemorrhage must come from organs of the true pelvis. Hemorrhages from parts situated

¹ *Martin-Magron and Soulié, Gaz. des hôp., 1861, No. 14.*

higher up may doubtless give rise to effusions into the peritoneal cavity, which may be fatal, and they may produce a coagulum of blood in Douglas's cul-de-sac, but can never cause the characteristic tumor which crowds the uterus forwards.

The hemorrhage in hæmatocele, therefore, may proceed from the Fallopian tubes, from the ovaries, from the broad ligaments, or from other portions of the pelvic peritoneum.

1. *Hemorrhage from the Fallopian tubes* may take place,

In consequence of a tubal pregnancy terminating in rupture, in which case the resulting hemorrhage or peritonitis is generally fatal immediately. But if Douglas's cul-de-sac has already been shut in by pseudo-membrane prior to the occurrence of the rupture, or if the blood is so slowly effused that the membranous capsule is formed while the hemorrhage still continues, or finally, if, after the hemorrhage has ceased, the blood is enclosed in false membrane, and fresh hemorrhages occur subsequently, the consequence is the production of a retro-uterine hæmatocele. A few hæmatoceles formed in this way have been observed upon the cadaver. It is not improbable that the hæmatocele originates in this manner oftener than is generally supposed, and for the reason that the existence of a tubal pregnancy in this affection is frequently not recognized. Such may perhaps be the case in many of those instances (which are frequent enough) where there has been a cessation of the menses for several periods previous to the occurrence of the hæmatocele, and the patient has at first been under the impression that she was pregnant.

Moreover, hemorrhages from the Fallopian tubes are not rare in connection with hæmatometra. There is obviously in this case a primary hemorrhage within the canal of the tube, and the blood, escaping through the abdominal orifice, or through a rupture, gains access to the cavity of the peritoneum. But this rarely gives rise to a hæmatocele, and probably for the reason that, as a rule, only a small quantity of blood escapes at the ostium abdominale at a time, and at each escape the blood becomes invested in false membrane immediately, so that in the vicinity of the tubal orifice a number of peritoneal thickenings are produced, each of which contains a small quantity of blood.

In exceptional cases a hemorrhage may take place into the

canal of the Fallopian tube during menstruation, and thence into the peritoneal cavity. Yet the hemorrhage is generally too slight in such cases to cause hæmatocele. Tubal hemorrhages are especially apt to occur, after ovariectomy, from the cut end of the tube, which is included in the pedicle, and, together with the latter, is replaced in the abdominal cavity.

2. *Hemorrhages from the ovaries* do not occur in normal ovulation, for there is either no hemorrhage at all in the Graafian follicle, or at the most but a very slight one. But in exceptional cases a more considerable hemorrhage may occur, or some vessel, perhaps in a varicose condition, may be ruptured elsewhere during ovulation.

At other times hemorrhages from the ovaries are more rare, unless due to ovarian diseases. The hemorrhage is then most apt to occur when varicose vessels cover the surface of the ovary, or when its stroma has become softened and somewhat disintegrated, in consequence of inflammation, and is, at the same time, decidedly hyperæmic. Moreover, there are certain other pathological conditions, such as the presence of small cysts, which predispose to the occurrence of hemorrhage.

Very frequently the ovarian hemorrhage occurs, in the first place, in a Graafian follicle, in a small cyst, or in the stroma of the ovary, thus forming a bloody cyst, which is ruptured, and the blood escapes into the peritoneal cavity.

3. *Hemorrhages from the broad ligaments* are rare; yet we occasionally find the peritoneal coating so thinned over thick varicose veins in the broad ligaments, that, should the veins burst, the hemorrhage would naturally escape into the cavity of the peritoneum.

4. *Hemorrhages from the serous coating* of the pelvis are pretty frequent causes of hæmatocele. Under these circumstances the process is very similar to that which takes place in the pachymeningitis hemorrhagica,¹ first described by Dolbeau² and Virchow.³ The very vascular pseudo-membranes which are formed in pelveo-peritonitis may both serve to hem in Douglas's

¹ *Ferber*, Arch. f. physiol. Heilk., 1863, III., p. 431.

² *Gaz. des hôp.*, 1860, No. 35.

³ *Die krankh. Geschw.*, 1863, B. I., p. 150.

cul-de-sac, and to supply the blood which forms the hæmatocele. Frequently, also, the hemorrhage takes place into a pre-existing, enclosed membranous space, which is filled with clear serum, the bloody effusion dilating its cavity still more. A very pretty instance of such a secondary hemorrhage from the walls of the cavity, in a pelveo-peritonitis serosa, is reported by Credé.¹ On puncturing the tumor in Douglas's cul-de-sac a clear serum was poured out first; then serum mixed with blood; and finally, pure blood; and on renewing the puncture, two days later, pure blood was discharged in such amount that the operation was not ventured again.

Though the hemorrhage may take place at any time from the above sources, and without any especial occasion presenting itself, yet it is particularly apt to occur in the event of such general or local causes intervening as tend to promote the liability of blood-vessels to rupture. In this connection a general predisposition to hemorrhages is of no little importance, whether owing to morbid conditions of the vascular walls generally, or to the presence of scorbutus, purpura, or a hemorrhagic diathesis; also in phosphorus poisoning, where there is a fatty degeneration of the vascular walls, hemorrhage may occur in the tissue of the ovary, and, a rupture taking place, the blood escapes into the peritoneal cavity.²

Moreover, physical exertions or sudden jars may occasion rupture of the distended vessels.

Furthermore, the local tendency to hemorrhage is increased by any hyperæmia of the pelvic organs, such as may be induced after exposure to cold (causing a congestion of all the internal organs), but particularly through sexual excitement. Of especial importance also is the physiological congestion which takes place at the time of menstruation. In the cases described by the French, the cause is not infrequently attributed to coitus exercised during the menstrual period.

Symptoms and Course.

It is rare that hæmatocele occurs suddenly in women who

¹ Monatsschr. f. Geb., B. 9, p. 1.

² Wegner, Virchow's Arch., B. 55, 1872, p. 12.

have previously been healthy. Generally various ailments have been complained of for a long time before.

In most cases signs of chronic peritonitis have existed beforehand, perhaps for years, with pains in the abdomen and back, together with various difficulties connected with the intestinal canal; also irregularities of menstruation often precede the affection, especially metrorrhagia, indicating a chronic condition of plethora in the organs of the true pelvis. It is doubtful as to what significance is to be attached to the amenorrhœa which, in a strikingly large number of cases, precedes the occurrence of the hæmatocele for from two to three months, and often leads women to believe that they are pregnant. We have already above alluded to the probability of a tubal pregnancy existing in many of these cases, and that its rupture may be the cause of the hæmatocele.

But though hæmatocele is often preceded by the various disorders just described, it nevertheless also develops suddenly as an acute disease. Marked fever occurs, which is seldom ushered in with a chill, but frequently by repeated rigors. The temperature is not generally much elevated, and sometimes at least it becomes normal again very soon after the commencement of the disease.

The other more prominent symptoms of hæmatocele are mainly referable to three sources—namely, to the partial peritonitis, to the internal hemorrhage, and to the pelvic tumor formed by the accumulation of blood.

The partial peritonitis may be of very different grades of intensity. Sometimes the peritonitic pains are extremely severe, and there may be considerable tympanites, or vomiting even, while in other cases all signs pointing to an acute though partial peritonitis are lacking. This is more especially apt to be the case when the hemorrhage has occurred into a cavity already enclosed; but even then the stretching of the walls of this cavity causes such an irritation of the peritoneum that spontaneous pain and considerable tenderness on pressure are never absent. The tenderness is evinced when an examination is made of the lower part of the abdomen, and it may be also extreme when the tumor is touched through the vagina.

The symptoms of the internal hemorrhage also vary in their degree of severity. The patient becomes suddenly pale, the pulse is small and weak, a sense of weakness or of faintness is felt, and sometimes complete syncope ensues.

Moreover, *a large tumor* is developed in Douglas's cul-de-sac (see Fig. 120), which, by its pressure upon neighboring organs, gives rise to various other symptoms.

1. Thus, the rectum may be pressed upon. In consequence of this, defecation becomes difficult, particularly if hardened masses of fæces have to pass the sensitive tumor, when the pain sometimes becomes excessive. The compression of the rectum, in conjunction very likely with an extension of the inflammation from the adjoining parts, causes the production of a catarrh of the rectal mucous membrane.

2. Pressure upon the bladder causes an increased desire to micturate, and, less frequently, retention of urine. Very frequently urination is painful.

3. Pressure upon the nerves gives rise to pains and to abnormal twitching of the inferior extremities. It is rare that the veins are so pressed upon as to cause œdema.

4. The uterus is crowded hard against the symphysis pubis. The engorgement of the womb with blood, which is produced in consequence of this, together with the hyperæmia which pervades all of the pelvic organs, may doubtless be regarded as the cause of the bloody discharges which so frequently occur, and which occasionally amount to a profuse hemorrhage.

The tumor that develops in the abdomen, and which is sometimes noticed by the patient herself, may be clearly demonstrated by palpation through the abdominal walls and by exploration through the vagina or rectum. It is situated behind the uterus, and crowds the womb forwards, and generally somewhat upwards. If examined externally, we find either in the mesian line, or most commonly on the left side, more rarely on the right, a roundish tumor which projects above the symphysis, and under certain circumstances may reach as high as the umbilicus. In some instances large tumors are felt on both sides, which are joined by a middle piece. Unless the tender-

ness is too great, the uterus can generally be felt in the shape of a little tumor lying in front of the larger one.

When an examination is made *per vaginam*, the finger impinges directly upon a large round tumor, which is situated not far from the vaginal entrance, occupies nearly the whole of the true pelvis, and so crowds the uterus against the symphysis that the cervix is felt lying close to its posterior surface. The uterus may be forced so high up that the external os can scarcely be reached. The size and spherical shape of the tumor can be best appreciated from the rectum. The tumor lies invariably just behind the uterus, though it often extends a little to one side, and is in immediate relation with the upper part of the posterior wall of the cervix. We may easily convince ourselves, by means of the combined method of examination, that the tumor which is felt externally, and that which occupies the true pelvis, are one and the same. The tumor is always very sensitive, and most markedly so when examined *per rectum*.

The tumor has generally an elastic feel, but seldom presents any fluctuation. In the case represented in Fig. 120, I could feel a peculiar crepitation, like that produced in crushing a snow-ball, which was caused by the coagula being pressed together. Gradually the consistence of the tumor undergoes a decided alteration. The tumor becomes hard and irregularly nodulated, while, meantime, the tenderness slowly disappears. Not infrequently, in making an exploration *per rectum* or *per vaginam*, the finger suddenly encounters a markedly softened spot in some part of the tumor, and immediately sinks in so deeply that it gives an impression as though the tissue had been perforated. This is the spot where the future perforation is to occur.

The large tumor does not always recede immediately after the first examination; sometimes it gradually increases; more frequently the increase is sudden, occurring by separate increments.

We attach an especial importance to the combined method of examination, on account of the affection of the body of the uterus; for this portion of the womb can always be felt in the form of a tumor lying in front of, but separate from, the larger

one, though occasionally the hæmatocele lies in intimate connection with the entire posterior surface of the uterus. If the sensitiveness is very great, the examination may be possible only while the patient is under the influence of chloroform.

Although the most characteristic condition of things found on examination is that described above, certain modifications may occur. One of the most common of these arises when Douglas's cul-de-sac has been previously obliterated, for then the bloody tumor forms higher up, and the protrusion into the upper portion of the vagina is wanting. I have observed such an instance in a married lady, twenty-eight years of age, who for four and a half years had been sterile. At the age of fifteen she had a very severe attack of typhus while in Munich, which was followed by peritonitis, with perforation of pus in the region of the umbilicus. For eight weeks this lady had regarded herself as pregnant, when suddenly she was attacked with intense pain in the abdomen. On making an examination I

found the condition represented in Fig. 121. Behind and above the uterus, which was strongly anteflexed, a great tumor had formed. The history of the case, the result of the examination, and the subsequent course, rendered it probable that, in consequence of the former peritonitis, the lower portion of Douglas's space had been sealed up, and that a tubal pregnancy, terminating in rupture, had caused the production of a bloody tumor in the pseudo-membranes higher up.

If Douglas's cul-de-sac is obliterated entirely, it is possible for an ante-uterine hæmatocele to occur, of which we shall treat separately hereafter.

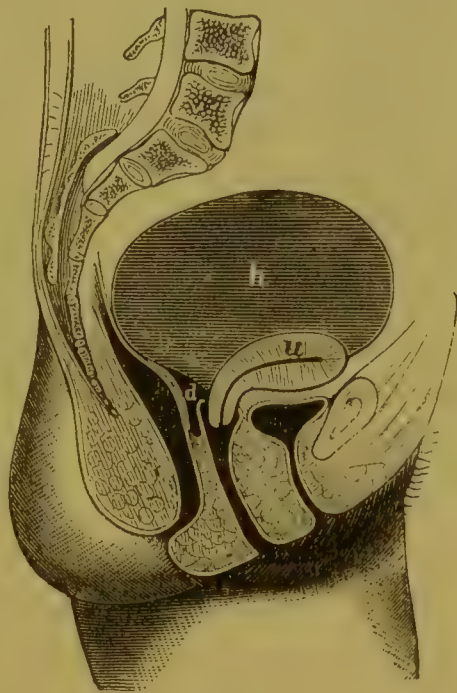


FIG. 121.

Hæmatocele with Douglas's cul-de-sac sealed up.

u, Uterus; h, hæmatocele; d, obliterated inferior portion of Douglas's space.

The course pursued by an hæmatocele is decidedly chronic, since the tumor remains, as a rule, for quite a long time stationary, and, in fact, as we have already seen, additions may be made to its size afterwards, through recurrences of the hemorrhage.

Since the painfulness also continues, and in case the tumor has increased in size, may even be augmented, the condition of the patient becomes, in the more severe cases, exceedingly distressing. The sensitiveness of the abdomen, the pain in the back, the incessant bearing down, and the disorders in the rectum and bladder, torment the patient extremely.

The mere loss of blood through the internal hemorrhage is hardly ever of itself a matter of any serious moment, though signs of anæmia, or even syncope, may follow. But it is only in such individuals as are already greatly debilitated that any serious danger need be apprehended from the hemorrhage merely.

The peritonitis, also, is seldom attended with danger to life at its first invasion.

The *ultimate result* varies according as resorption or perforation takes place.

In the most favorable event resorption occurs, and the tumor gradually decreases in size, becoming harder and somewhat nodular. Meantime the cervix recedes more and more from the symphysis towards the middle of the pelvis, the distressing symptoms gradually diminish in violence, and very slowly—in the course of months—the hæmatocele disappears, leaving only a remnant behind, which consists of a hard, retro-uterine tumor, which remains firmly attached to the uterus. The womb never regains its normal mobility.

If perforation ensues and the blood is evacuated, an inflammation of the walls of the hæmatocele first takes place; new inflammatory symptoms are developed; one spot becomes softened and is finally broken through.

Most commonly the perforation takes place through *the rectum*. It is preceded by signs of intestinal catarrh, but nevertheless occurs suddenly, with a profuse diarrhœa, and the discharge of masses of black, friable matter. Immediately after the

first discharge the patient's condition is markedly alleviated, and continues to improve with the further evacuation of the contents of the tumor, which often lasts for a considerable time. As the evacuation proceeds, the tumor diminishes in size, and gradually wastes away until the perforation is closed, and only a vestige of the tumor is left behind, with the obliterated Douglas's cul-de-sac. But the perforation may also result in an ichorous inflammation, terminating in death.

Perforation into *the vagina* is of much rarer occurrence, and when it occurs is accompanied with vaginal catarrh. There may also be a simultaneous perforation into both vagina and rectum.

But one case, according to Ott,¹ has been recorded of perforation into *the bladder*, and in this a perforation through the abdominal walls was threatened at the same time.

Perforation into *the peritoneal cavity* is very rare. The result is then unavoidably fatal, unless the blood which escapes is perfectly fresh.

In all these cases there is the danger that either while the perforation is taking place, or during the gradual evacuation of the cavity, the walls of the cyst may suppurate, and the contents become decomposed. The usual result, under these circumstances, is death from peritonitis or exhaustion.

Sometimes, also, the cavity of the abscess remains open, in which the pus collects until it is expelled through the narrow fistulous opening of the perforation, and in this way repeated discharges of pus may occur from time to time through the rectum.

Diagnosis.

The condition found on examination in hæmatocele is so remarkable and so characteristic that the disease suggests itself directly. Therefore, inasmuch as the physical examination in conjunction with the facts presented by the history of the case are fully competent to establish a positive diagnosis; we may confine ourselves to the consideration of the points of difference which exist between hæmatocele and the conditions which are more or less apt to be confounded with it.

¹ Revue clinique hebdomad. de la Gaz. des hôp., 1861, p. 53.

We come first to speak of *perimetritis*, which, under certain circumstances, can only be distinguished from hæmatocele by an exploratory puncture; for, certain forms of perimetritis exhibit precisely the same features as the disease which we are considering. The differential diagnosis will most depend upon the anamnesis—upon the ascertainment of certain facts in the history of the case. A very acute development of the large tumor, the sudden onset of the symptoms, together with the occurrence of an acute anæmia, are points in favor of hæmatocele. Moreover, the course pursued by the two diseases is different. The hæmatocele, unless perforation takes place, grows smaller and harder, does not present a uniform consistency, and becomes nodulated; while the serous peritonitis may, for a long time, remain unchanged, and the perimetritic abscess perforates. Yet a fibrinous exudation, on the other hand, may follow exactly the same course as that pursued by an hæmatocele. The peculiar crepitation, which is sometimes imparted to the finger by the coagulated blood, appears to be a rare feature of the disease.

Hæmatocele is peculiarly liable to be mistaken for *retroflexio uteri gravidæ*, in cases where (as not infrequently happens) the patient has before been laboring under the impression that she was pregnant. The examination per vaginam shows a very striking resemblance. In retroflexion we may feel, on external examination, the greatly distended bladder, which could not be mistaken for the tumor of hæmatocele, and besides, in the case of the latter disease, the fundus uteri will be felt pressing against the anterior abdominal wall. But in order to establish these points with certainty it may be necessary, on account of the frequently excessive sensitiveness of the patient, to make the examination under chloroform.

Ovarian cysts, also, or *uterine fibroids*, which have become engaged in Douglas's cul-de-sac, may give rise to an inflammation in their vicinity, and produce almost precisely the effect of a hæmatocele; yet their course and mode of development are essentially different. In case of necessity the question may be decided by an exploratory puncture.

Extra-uterine pregnancy in Douglas's cul-de-sac is very rare, but for this very reason may render the differential diag-

nosis all the more difficult, and, furthermore, many of the anamnestic points may show a marked degree of similarity. The tumor, to be sure, develops slowly in extra-uterine pregnancy; but this fact does not always clearly appear, and we are obliged to resort to the exploratory puncture. It is also important to note the fact that in extra-uterine pregnancy the uterus shows a very considerable enlargement, which could only occur, in connection with hæmatocele, as an accidental complication.

Retro-uterine carcinomata may usually be recognized without difficulty, by means of the anamnesis, by their gradual development and nodulated form, and by the various signs of malignant disease.

To ascertain whence the hemorrhage proceeds is a still more difficult task than to make the differential diagnosis of hæmatocele. In the majority of cases it is mere matter of conjecture, though, to be sure, under certain favorable circumstances, this conjecture may be rendered tolerably plausible. Thus, in one case which I observed, it was believed that the diagnosis of a tubal pregnancy could be made with considerable certainty, since the history of the case favored it, and a tumor which was distinct from the hæmatocele could be felt in the region of the Fallopian tube. Where there have been previous attacks of perimetritis, or if an enclosed serous exudation, known to have existed before, becomes suddenly increased in size, it is natural to refer the hæmatocele to a hæmorrhagic pelveo-peritonitis. If, on a former examination, small ovarian tumors have been discovered, the inference arises that the source of the hemorrhage exists in the ovary. In the absence of all local indications, but with well-marked varicose veins in the lower extremities, one might surmise that the rupture of a varicose vein in the broad ligament was the cause of the trouble.

Prognosis.

Hæmatocele is always a very serious affection, partly on account of the decided derangement of health which is sure to follow in time, but likewise by reason of the danger to life; moreover, the after-effects of hæmatocele are often of a serious nature.

Death is an exceptional result, and is most generally caused by suppuration of the tumor, together with the development of putrefactive changes in the contents. Among the ill effects of the hæmatocele may be mentioned the permanent displacements of the uterus, recurrent attacks of perimetritis, and sterility, which latter is due generally to adhesions about the ovaries and occlusion of the Fallopian tubes. Yet conception is by no means an impossibility after the occurrence of hæmatometra. Hæmatocele very rarely occurs a second time.

Treatment.

Generally speaking, the treatment of hæmatocele must be expectant, depending entirely upon symptomatic indications. When the tumor has first developed, the external application of cold is the measure of chief importance. For this purpose ice-bags may be applied to the abdomen; sometimes the introduction of bits of ice into the vagina also affords relief. Two indications are met by means of the application of cold, viz., to restrict the partial peritonitis within circumscribed limits, and secondly to moderate the internal hemorrhage. Local depletion is but exceptionably applicable, and only to those cases where the peritonitis threatens to become general and when the hemorrhage into the retro-uterine tumor has produced no symptoms of anæmia. In case there are no especially urgent symptoms present, it is only necessary further to insist upon absolute rest, to pass the catheter if required, and to administer such mild laxatives as will prevent the passage of any large, hardened masses of fæces by the side of the tumor, which might cause increased irritation and aggravate the pain.

When the hæmatocele follows its typical course, further treatment, aside from the administration of narcotics to quiet the pain, is entirely unnecessary; for, as a rule, the contents of the tumor become inspissated, and all but a small remnant of the hæmatocele is reabsorbed.

Since the issue in resorption is the most favorable one, the artificial evacuation of the tumor can only be warranted in the presence of a special indication. Such an indication may arise

from the immense size of the tumor or from the occurrence of suppuration or putrefaction of its contents.

With regard to the first of these indications, the distress occasioned by the pressure of the tumor may be so great that it becomes necessary to reduce the size in order to obtain any relief. But even in such cases the operation should be delayed as long as possible, lest a fresh hemorrhage should take place while the tumor is being emptied. Since, in all such cases, the contents of the tumor are still fluid, the puncture should be made with the finest possible trocar, and under all the precautions which will prevent the admission of air into the cavity.

If air is admitted suppuration and decomposition ensue, but they may also follow a spontaneous perforation. Under these circumstances the entire mass of blood must be evacuated. This can only be accomplished by making a wide incision into the tumor, which protrudes into the vagina, and by then removing the clots with the finger. A solution of carbolic acid is afterwards injected into the cavity to cleanse its walls, and in order to avoid, if possible, the threatened peritonitis or pyæmia.

If the blood has perforated spontaneously, and no inflammatory signs have appeared in the contents of the tumor, we should be cautious about hastening the evacuation of the blood, since by this means air or intestinal gas may easily gain access to the cavity and render decomposition unavoidable.

If perforation into the rectum is threatened, the treatment should be purely expectant; if the tumor is about to break into the vagina, a puncture or a cautious incision may be made at the place where the perforation is most imminent.

ANTE-UTERINE HÆMATOCELE.

By the term ante-uterine hæmatocele we designate a bloody tumor lying in the peritoneal fold between the uterus and the bladder.

A bloody tumor may develop in this situation under differing conditions. In the first place, it may form a portion of a large retro-uterine tumor, the effused blood being enclosed in pseudo-membranes which extend over the uterus on to the ante-

rior wall of the abdomen. The vesico-uterine cul-de-sac is then also filled with blood.

It is very rare that the ante-uterine hæmatocele develops as in a case reported by G. Braun,¹ where the hemorrhage escaped into the peritoneal pouch lying in front of the uterus,

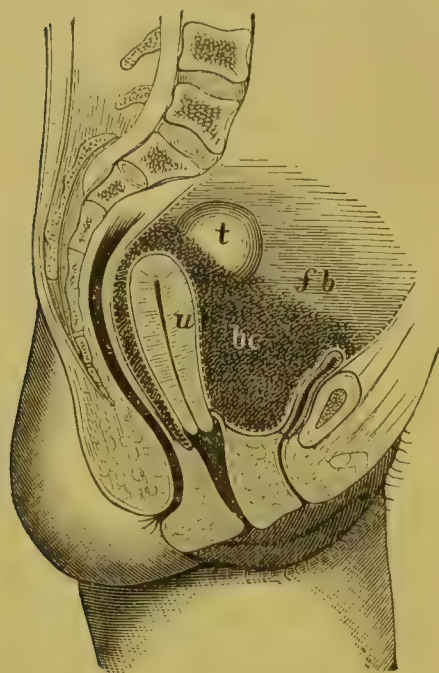


FIG. 122.

Hæmatocele ante-uterina.

u, Uterus; t, foetal sac in the tube; bc, blood coagula; fb, fluid blood.

this pouch having been previously bridged over by false membrane. Such cases are extremely rare; in the first place, because peritonitic adhesions are of far less frequent occurrence in front of the uterus than behind it, and secondly, because the Fallopian tubes and the ovaries, which often give rise to hemorrhages in the retro-uterine space, are not apt to be so displaced as to lie in the vesico-uterine cul-de-sac.

I have myself seen an exceedingly interesting case of ante-uterine hæmatocele,² in which the large bloody tumor (see Fig. 122) was developed in the following manner: The hemorrhage was due to the occurrence of rupture

in a tubal pregnancy; but, since the anterior wall of the rectum lay closely adherent to the uterus, the blood flowed into, and became coagulated in, the hollow formed between the empty bladder and rectum, this hollow forming the most dependent portion of the abdominal cavity, inasmuch as Douglas's cul-de-sac had been obliterated.

THROMBUS OR HÆMATOMA OF THE CONNECTIVE TISSUE (HÆMATOCELE EXTRA-PERITONEALIS).

Effusions of blood into the pelvic connective tissue, aside

¹ Wiener med. Wochenschr., 1872, Nos. 22 and 23.

² Arch. f. Gyn., B. V., Heft. 2.

from those due to traumatic causes, are very rare excepting in childbed. They may occur in any situation in the connective tissue, depending upon the occasioning cause and the source of the hemorrhage. They do not conform therefore to any certain rules, and may give rise to tumors of the most various description.

TUMORS OF THE PELVIC PERITONEUM AND PELVIC CONNECTIVE TISSUE.

Cysts.

Spencer Wells, Diseases of the Ovaries, p. 30.—*Atlee*, Ovarian Tumors, etc., p. 107.
—*Peaslee*, Ovarian Tumors, etc., p. 99.—*Bantock*, Obstet. Journ. of Gt. Brit., May, 1873, p. 124.—*Koeberlé*, Ibid., September, 1873, p. 422.

A number of pedunculated or non-pedunculated cysts not infrequently occur in the vicinity of the Fallopian tubes.

Other cysts develop from the parovarium, the ducts of which are lined with ciliated epithelium; yet all the cysts which occur in the broad ligament can scarcely be derived from the parovarium alone, but some of those which lie near the uterus doubtless proceed from that portion of the Wolffian body which originally belonged to the kidney, and vestiges of which remain, according to Waldeyer,¹ in the shape of little canals filled with epithelial cells, which lie between the parovarium—the sexual part of the Wolffian body—and the uterus.

These cysts of the broad ligament generally remain small, but exceptionally they may become as large as ovarian tumors.

As a rule, they have thin walls (*Spiegelberg*² found smooth muscular fibres in them), and are lined internally with cylindrical epithelium, which is occasionally ciliated. They are not generally pedunculated, but spring from the broad ligaments in the form of sessile growths, and lie either in close proximity to the ovary or are distinctly separated from it. The Fallopian tube is usually lengthened and curved over them.

Their contents consist of crystal-clear serum, with a low spe-

¹ Eierstock und Ei., p. 142.

² *Spiegelberg*, Arch. f. Gyn., I., p. 482.

cific gravity (1.004–1.005) and contain no albumen, or else but a very slight amount.

They do not appear to fill again, as a rule, after they have once been punctured.

Myoma, Fibroma, and Fibro-Myoma.

The tumors of this description doubtless originate as tumors of the uterus, which have grown in between the layers of the broad ligament, and the peduncle has afterwards become detached from the womb. According to Virchow,¹ however, myomata may also develop in the uterine ligaments originally.

Schetelig² describes a cysto-fibro-myoma, which probably originated in the uterus, although it was not connected with it.

Carcinoma and Tuberculosis.

These diseases present nothing characteristic in their features, since they merely represent affections of the peritoneum of the pelvic region.

DISEASES OF THE VAGINA.

Malformations.

The vagina, like the uterus, is developed from the two canals of Müller, whose coalescence begins in the upper portion of the vagina. All of the malformations of the vagina are produced in consequence of the destruction or imperfect development of one or both of Müller's canals, or are due to the failure of their coalescence. This subject has already been touched upon in speaking of the malformations of the uterus.

Complete Non-development and Rudimentary Formation of the Vagina.

Kussmaul, Von dem Mangel, etc., der Gebärmutter. Würzburg, 1859.—*Klob*, Pathol. der weibl. Sexualorg., p. 412.

Practically these two conditions are equivalent to each other,

¹ Geschwülste, III., 1, p. 221.

² Arch. f. Gyn., B. I., p. 425.

and, as a rule, the one is not distinguished from the other anatomically; yet bands of connective tissue, which run in the course of the vagina, must be regarded as a rudimentary vagina, the same as in the case of the uterus.

Malformation of the vagina may occur in connection with complete non-development or rudimentary formation of the uterus, or it may occur independently of either of these conditions, the uterus being normal.

Those portions of Müller's canals, out of which the vagina is developed, may be only partially obliterated, and consequently we sometimes meet with merely a blind pouch in the situation of the vaginal portion of the cervix, or there may be only a very shallow cul-de-sac just back of the hymen. In still other cases the vagina is only wanting in the middle, so that the two open ends are separated merely by a membrane of various degrees of thickness. Sometimes the latter is exceedingly thin, and it may be perforated by various-sized openings.

The instances in which the upper and lower blind pouches overlap each other to a certain extent without joining, are doubtless to be explained on the supposition that in one of Müller's canals the upper portion was obliterated, while in the other it was the lower portion.

Vagina Unilateralis.

If only one of Müller's canals is developed, while the other remains non-developed, or in a rudimentary state, there is, morphologically speaking, but a half-vagina. The fact that this malformation has hitherto received no attention is owing to the difficulty of demonstrating its presence with any certainty; for such criteria as are available in this connection with regard to the uterus (the form and mode of attachment of its appendages), are, in the case of the vagina, entirely lacking. It is probable that in the great majority of cases of uterus unicornis, but one of Müller's canals has developed in the region also of the vagina.

Doubtless many of the cases of partial duplication of the vagina are to be regarded simply as instances of partial development of one of the halves.

Vagina Septa.

When the whole vagina is double there is always a double uterus, and, generally, a double hymen is found. When one of the vaginal canals is closed below, hæmatometra is developed on that side.

The two vaginæ do not always lie exactly side by side; according to Dohrn, the left canal of Müller lies a little in front of the other.

When the duplication of the vagina is partial, it generally affects the lower portion (the upper remaining single), owing to the fact that the coalescence begins at the top. Yet it is not rare in connection with a double uterus to find the upper part of the vagina double (the septum being continued into the vagina), while, below, the coalescence has taken place.

In other cases isolated septa or bridge-like bands are stretched across the vagina, these being the remnants of a former partition (in many cases, too, they may be owing to foetal adhesions which have afterwards been stretched).

If a double vagina occurs in connection with a single uterus, one of the halves is always rudimentary.

Congenital Smallness of the Vagina.

A congenital, abnormal narrowness of the vagina is most apt to occur in a marked degree in conjunction with various malformations of the uterus, but more particularly with the foetal and infantile varieties. A narrow vagina, occurring in connection with a uterus unicornis, is probably always a vagina unilateralis.

An abnormal shortness of the vagina may be produced, also, in consequence of some special error of development.

An operation is indicated in case of occlusion of the vagina only when a hæmatometra has developed, for the internal genitals are generally so malformed that it is useless, with any other object in view, to attempt the formation of a vagina artificially; and moreover, unless the uterus is present to afford a guide to the operation, there is great danger of serious damage being done.

The bridge-like bands of the vagina, as well as the partial duplications, are only to be operated upon when they cause interference with cohabitation or with parturition.

The congenital narrowness of the vagina forms an obstacle to cohabitation only, but it is generally overcome by the repeated efforts of the male ; but, if necessary, compressed sponge may be introduced, as would be especially indicated in the event of a partial narrowing.

Atresia of the Vagina.

Atresia, with resulting hæmatometra, has already been described under atresia uterina.

INFLAMMATION OF THE VAGINA.—VAGINITIS, COLPITIS, ELLYTHRITIS.

Kölliker and Scanzoni, Scanzoni's Beiträge, II., p. 128.—*Tyler Smith*, Pathol. and Treat. of Leucorrhœa. London, 1855.—*Hennig*, Der Katarrh der weib. Geschlechtsorgane, 2. Aufl., and the literature cited under Endometritis.

Acute Catarrhal Inflammation.

Etiology.

The most frequent cause of acute inflammation of the vagina is gonorrhœa. Besides this, traumatic influences of every description may give rise to it. Under certain circumstances coitus may be reckoned among the traumatic influences. But the latter also arise frequently in connection with various surgical procedures, such as cauterization, too cold or too hot injections. Pessaries may also produce them, or putrid or other discharges.

Acute catarrh may be developed during menstruation, particularly if at the same time the patient be exposed to injurious influences, such as cold especially.

Not infrequently the acute catarrh represents merely an exacerbation of a chronic catarrhal affection.

Finally, the acute form of vaginal catarrh may occur in connection with the acute exanthemata, and particularly measles.

Acute colpitis is by far most common in women at the age of greatest sexual activity; but traumatic agencies may produce it even in children, and, not rarely, it is met with after the menopause. We have observed it in one case where the uterus was completely atrophied, and where it was impossible to attribute it to the cause assigned by Hildebrandt, namely, to a patulous condition of the vulva, facilitating the intrusion of dust and cold air.

Pathological Anatomy.

The signs of an acute catarrh present themselves in this affection. The mucous membrane is reddened, swollen, and has a soft, velvety feel. The prominent folds are greatly swollen, forming ridges, upon whose summits a considerable injection is found, or even hemorrhages, or the epithelium is so easily wounded that a free bleeding readily takes place.

The mucous follicles of the vagina are swollen up in the form of little cysts.

At the beginning of the catarrh the secretion of the vaginal mucous membrane is diminished; later it becomes increased, and has a muco-serous or a purulent character.

The colpitis due to gonorrhœa differs in no essential respect from the other form, excepting that it is apt to be associated with a catarrh of the urethral mucous membrane, and an inflammation of the follicles about the orifice of the urethra. Moreover, suppuration of the glands of Bartolini is of frequent occurrence in gonorrhœa.

While the ordinary acute colpitis extends usually over the whole vagina, the gonorrhœal catarrh is often confined to the lowest portion; yet circumscribed inflammations may occur also in the cul-de-sac of the vagina, owing to the extension of an inflammation from the uterus.

There is also a very peculiar form of colpitis which occurs in just the upper portion of the vagina, and has been described by Hildebrandt,¹ and designated by him as *vaginitis ulcerosa adhesiva*. In it the mucous membrane is deprived of its epithe-

¹ Monatsschr. f. Geb., B. 32, p. 128.

lium at the upper part of the vagina, and presents an excoriated appearance, with slight papillary hypertrophy. The consequence of this inflammation is the adhesion of the vaginal portion of the cervix to the lateral walls of the vagina, so that the vaginal cul-de-sac is completely obliterated, and the os is then felt at the apex of the funnel-shaped upper portion of the vagina.

I have myself observed the results of this process; in one case the superior portion of the vagina was completely occluded, and in another instance there was a partial occlusion below the vaginal portion of the cervix. Neither of the patients had ever borne children, and the affection had doubtless been contracted previous to the marriage. In one of the cases the resulting hæmatometra perforated during the wedding trip, and was discharged through the vagina. In a third case, a uniform stenosis occupied a good portion of the upper half of the vagina. The right side of the vaginal arch was adherent, while the left formed a blind pouch.

Symptoms.

The acute catarrh may begin with decided febrile symptoms. It runs its course in a period of some weeks, if the proper treatment is pursued, and terminates in recovery. Otherwise, it lapses into a chronic blennorrhœa, as it is especially apt to do in the gonorrhœal form.

In the severer cases, besides the discharge, pains in the abdomen are complained of, which are occasionally of an exceedingly distressing nature. A continual sensation of bearing down is present, and sometimes spasmodic contractions of the constrictor cunni occur, with tenesmus of the rectum and bladder.

Treatment.

As a rule the treatment can be mainly expectant. A slight diversion may be created by way of the intestinal canal, and decomposition of the secretion is obviated by means of very cautious injections at a temperature of about 95° F. At the same time care should be exercised in the avoidance of unfavorable

influences, and absolute rest is to be enjoined. In case spasmodic pains exist, great relief is derived from warm hip-baths.

Croupous and Diphtheritic Inflammation of the Vagina.

Etiology.

Croupous and diphtheritic membranes may develop upon the mucous membrane of the vagina in two ways: they may occur only at certain points, in consequence of local injuries, while the rest of the mucous membrane is barely affected with a catarrhal inflammation, or they may appear in the form of a croupous or diphtheritic inflammation, which involves the whole of the mucous membrane, or at least its greater upper or lower portion.

Isolated membranes may occur in all those cases in which the vaginal walls are exposed to the irritation of ichorous discharges, such as are present in carcinoma of the uterus or in ulcerating fibroids and polypi. Or they may be caused by pessaries which have been left in the vagina for an undue length of time. Again, in prolapse of the vagina or uterus, membranous deposits may develop upon ulcers, which form in parts exposed to external injuries. Moreover, it is not uncommon to see firmly adherent diphtheritic deposits in cases of vesico- or recto-vaginal fistula, where the urine or fæces remain long in the vagina.

A croupous or diphtheritic inflammation of the greater portion of the vagina occurs, excepting in gonorrhœa (in which, by the way, it is very rare) and during the puerperal state, only in connection with the acute infectious diseases—measles, small-pox, typhus, and cholera.

Pathological Anatomy.

Where the affection of the mucous membrane is limited, we find whitish membranes in spots of moderate extent, which may be easily separated from the mucous membrane, or are firmly adherent to it. The rest of the mucous membrane appears about normal, or is merely affected with a slight catarrh.

The general diphtheritis of the vagina presents a much severer character. The swelling of the mucous membrane is very great,

and the septum recto-vaginale may have the appearance of a large tumor, occluding the passage of the vagina, and the mucous membrane of the cul-de-sac may swell up even with the vaginal portion of the cervix, so that the finger cannot pass beyond the os. White and green diphtheritic membranes cover the vaginal mucous membrane to a greater or less extent, and a purulent secretion, with a foul, cadaverous odor, flows from the vagina. In diphtheritis of the upper part of the vagina, the vaginal portion of the cervix is involved; the swelling of the mucous membrane covering it increases its circumference, and the lining membrane of the cervix is swollen up in thick ridges. I have seen the cervical mucous membrane so swollen as to protrude from the external os, and to the touch appear like a mucous polypus as large as a walnut. In the healing process, which advances very slowly, considerable strictures may be produced, and the vault of the vagina may become adherent to the vaginal portion of the cervix.

Symptoms.

The symptoms are very like those of the severer forms of the acute catarrh. Fever is present only at the commencement; the symptom which elicits the greatest attention afterwards is the discolored, bloody-purulent discharge, with its abominable odor. In addition to this, there are pains in the pelvis, bearing-down sensation, and spasms of the constrictor cunni and other muscles of the perineum.

The diphtheritic exudations which occur in connection with the putrid discharges in carcinoma or fistulæ occasion no special symptoms.

Diagnosis.

Generally the form of the inflammation is diagnosticated in the discovery of the membrane. In case a diphtheritis of the upper portion of the vagina is very severe, it may present precisely the same features as would be exhibited by an ulcerating carcinoma or mucous polypus of the cervix which gives rise to a putrid discharge, inasmuch as the diphtheritis transforms the vaginal portion of the cervix into a shapeless tumor. The ques-

tion must be decided by a careful examination, and, in case of necessity, by watching the further course of the affection.

Treatment.

Naturally the most important point in the treatment is to remove the cause. If this is quickly done, as is possible in the case of ulcerating polypi or forgotten pessaries, recovery follows immediately, attention being paid merely to cleanliness. Moreover, in all cases attention to the latter requirement, together with the application of a solution of carbolic acid, always effects a cure ultimately, though the mucous membrane may continue to granulate for some time, and considerable cicatricial contractions may be left behind. The latter result is best obviated by the insertion of greased tampons between the contracting walls of the vagina.

PERIVAGINITIS PHLEGMONOSA DISSECANS.

Marconnet, Virchow's Archiv, B. 34, 1 and 2.—*Minkiewitsch*, Ibid., B. 41, p. 437.

Three cases of this affection have been described ; its etiology is unknown. In *Marconnet's* two cases there was a suppurative inflammation of the submucous connective tissue which caused the separation of the entire vagina, including the mucous membrane and muscular layer, and the vagina was expelled in consequence, in the shape of a perfect tube, together with the mucous covering of the vaginal portion of the cervix. Healing followed with suppuration.

The case of *Minkiewitsch* was of a more malignant character. In this instance also the vagina was expelled *in toto*, but the patient died, and at the autopsy the posterior vesical and anterior pelvic walls were found gangrenous.

CHRONIC CATARRH OF THE VAGINA.—FLUOR ALBUS.—LEUCORRHEA.

Etiology.

Chronic catarrh of the vagina is an exceedingly common

affection. Sometimes it is the sequel to an acute colpitis, and both to the benign and the malignant varieties; but much oftener it occurs as an independent disease.

A long-continued hypersecretion of the vaginal mucous membrane may be owing to climatic influences or to anomalies of the constitution. It is of especially frequent occurrence in connection with chlorosis. But every local irritation to which the vagina is subject may give rise to a catarrhal secretion. Among such irritations may be reckoned too frequent coitus, which in newly married women, not before accustomed to it, is a very common source of chronic catarrh. Next, a whole series of operative procedures belong here; but, above all, the employment of too hot or too cold injections. Vaginal pessaries invariably irritate the mucous membrane, and those which are constructed of good materials and properly adapted differ in this respect from the others only in degree. The vagina is exposed to a very continuous irritation when in prolapse of the uterus and vagina it comes to lie outside the vulva between the thighs (but, on the other hand, a long-continued catarrh may lead to hypertrophy and relaxation of the vaginal walls, and so be the cause of the prolapsus).

Moreover, affections of the uterus—particularly inflammations, though also displacements and new-growths—may readily cause a catarrh of the vaginal mucous membrane.

Finally, it may be produced where there is an engorgement of the blood-vessels of the lower half of the trunk, such as may occur in consequence of diseases of the liver, lungs, or heart, or through the presence of abdominal tumors. But large-sized tumors in the true pelvis may also, by means of the local irritation which they excite, give rise to a hypersecretion of the vaginal mucous membrane.

Pathological Anatomy.

We not infrequently find in cases in which the vaginal catarrh has become decidedly chronic—that is, has lasted for months—the same alterations in the mucous membrane as we meet with in the acute catarrh; this seems to be particularly the case in gonorrhœa. We then find marked injection, and

occasionally ecchymoses at the top of the swollen ridges of the mucous membrane, and purulent secretion. If these changes have receded, or in case they were never very marked, the mucous membrane feels smooth, firm, and rigid. Its color is brownish red or a slate gray; sometimes it is studded with irregular spots of pigment—the remains of hemorrhages in the mucous membrane.

The characteristic mark of the chronic catarrh is the secretion. It always has an acid reaction, and is frequently merely the physiological secretion much increased—that is, it is thick, whitish, and creamy, and consists of exfoliated pavement epithelium, together with a few mucus corpuscles. The latter are, in other cases, mingled with the secretion in larger amount, and pus corpuscles may be superadded; occasionally the secretion may become almost entirely purulent. Not infrequently we find the *trichomonas vaginalis* and fungus spores in the catarrhal secretion.

Symptoms.

When the affection pursues a very chronic course, the discharge is the only symptom. This may, however, be exceedingly troublesome, or even pernicious to health if it is very profuse, since it erodes the vulva and thighs, and induces general disturbances of nutrition. The latter manifest themselves in very different degrees. Many women become very much reduced in health through a long-continued, though only slight discharge, while others present a flourishing appearance with a profuse blennorrhœa.

If the chronic catarrh has caused a relaxation of the vagina, a certain degree of prolapse results, which occasions bearing-down pains, as well as the annoying sensation of a foreign body in the vulva. The course is exceedingly chronic. A leucorrhœa may last for years, or even for a lifetime.

Treatment.

For the sake of moderating the hypersecretion an endeavor should always be made to obviate the causes upon which it depends.

Thus, in chlorotic patients the administration of iron will not infrequently cure the leucorrhœa by itself, without local treatment. The removal of an ill-adapted pessary, or, on the other hand, if there is a prolapse of the vagina, the introduction of a suitable ring may be followed by the complete disappearance of the secretion, or at least moderate it to a large degree. Furthermore, the treatment of any coincident uterine disease, especially the cervical catarrh, is important in this connection.

With regard to the local treatment, simple cleanliness will often accomplish the desired result, since when the secretions lie for a long time stagnant in the vagina, they become themselves a source of irritation to the mucous membrane. The injections which this treatment necessitates should, of course, be made in a very cautious manner—that is (aside from taking care to introduce the instrument employed carefully), they should not be made with too forcible a stream, and should be neither too cold nor too warm. A temperature of about 95° F. may be commenced with, and then gradually and cautiously lowered. In the event of the colder injections not being well borne, as not seldom happens, they should be refrained from.

Injections with the waters of alkaline springs, such as Ems and Neuenahr, prove especially efficacious.

These simple measures, however, are resisted by the more inveterate catarrhs, and it becomes necessary to add some astringent to the fluid injected, such as tannin, alum, chloride of iron, nitrate of silver, etc.

Should injections not answer the purpose—the injected fluid not reaching the whole surface of the vagina—other methods of application may be employed with advantage.

A very effectual method, and one which is particularly adapted to the application of concentrated solutions, consists in introducing the glass speculum so as to bring the vaginal portion of the cervix into view, and then, after pouring the fluid into the speculum, drawing the latter slowly out, by which means the solution is brought gradually into contact with every portion of the vaginal mucous membrane. This method is more effectual than when the solution is applied through the speculum with a brush. Small tampons of cotton, or small sponges

which have been saturated with the astringent, may also be introduced into the vagina. For this purpose Scanzoni recommends a drachm tannin to an ounce glycerine. Even glycerine alone has a desiccating effect upon the mucous membrane, since it abstracts its watery portions, and while remaining in contact with it occasions an increased serous discharge. The cotton tampons may also be sprinkled with powdered alum or smeared with an astringent ointment (eighty grains of alum to an ounce fat, according to Hildebrandt).

A very excellent application also consists in the introduction into the vagina of little balls of cacao-butter and tannin (four grains of tannin and forty-six of cacao-butter in each ball). The warmth of the body gradually melts the cacao, and the tannin contained in the liquid fat is brought extensively into contact with the vaginal walls.

PROLAPSUS VAGINÆ.

Vid. literature cited under Prolapsus uteri.

Etiology.

A primary vaginal prolapse may be produced by all those conditions which cause an elongation of the vagina, if at the same time they are associated with a relaxation of the vaginal mucous membrane and of the organs in its vicinity.

A slight degree of prolapse, a protrusion of the vaginal mucous membrane through the orifice of the vagina, may, it is true, be produced by a simple lengthening of the vagina without any relaxation. The most perfect instance of this is seen in pregnancy. The vagina becomes then so much elongated that, although its upper portion is displaced backwards and upwards, yet in many cases its anterior wall, and not infrequently both the anterior and posterior, are protruded beyond the vaginal orifice.

It is especially in chronic catarrh that the vagina becomes at the same time both hypertrophied and relaxed, and is also then less firmly united than usual to the subjacent tissues. Hence it is very common in catarrhs of long standing for the anterior and posterior walls of the vagina to project into the vaginal orifice.

The vagina is apt to be prolapsed, too, in old women, in connection with the loss of adipose tissue and the relaxation of the tissues generally, and this would be still more common were not the prolapse in a certain measure counteracted by the senile atrophy of the vagina.

In prolapse of the vagina it is always the anterior or posterior wall which is affected, and never the lateral walls. This is readily explained by the accompanying figure, (see Fig. 123), which represents the transverse section of the vagina, according to Henle. The lumen of the vagina is filled up by the collapsed anterior and posterior walls, so that it is only they which can become prolapsed.

But the anterior and posterior walls differ from one another in certain essential respects.

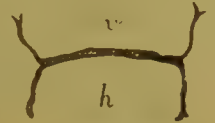


FIG. 123.
Shape of the vagina in
transverse section,
after Henle.

v, Anterior, *h*, posterior wall.

The anterior vaginal wall is more liable to a slight degree of protrusion through the rather narrow orifice of the vagina, on account of the direction of the vaginal canal, while the posterior wall is exceedingly apt to become prolapsed whenever the perineum is shortened (see Figs. 69 and 70, page 190). Yet, the total absence of the perineum, as in the case of cicatrized large perineal ruptures, is not in itself sufficient to produce prolapse of the posterior vaginal wall, but there must be also a relaxation of this wall. So long as the vagina is normal it does not become prolapsed, even in exceedingly large ruptures of the perineum, and indeed the cicatricial contraction which takes place in connection with the healing of the rupture tends to counteract the production of a prolapse, inasmuch as the posterior wall of the vagina is thereby greatly shortened.

The condition of neighboring parts—the pelvic connective tissue, the bladder and the rectum—has an exceedingly important bearing upon the displacement of the vagina.

If the vagina is united with the parts in its vicinity by means of short unyielding connective tissue—as it is normally—it is impossible for a prolapse to take place so long as these organs are in a normal condition. But if the connective tissue is spongy and can be easily stretched, the vagina sinks down somewhat, so that its cul-de-sac disappears; instead of ascend-

ing to envelop the cervix, the vagina begins to descend directly from the external os. Such a condition of things is particularly common after the puerperal stage, and occurs also in old women.

If, then, at the same time, the posterior vesical and anterior rectal walls are relaxed, as is very commonly the case, they also participate in the downward tendency (see Fig. 71, page 190).

In other cases, however, under favorable circumstances (that is, in a relaxed condition of the vagina), the displacement of the bladder and rectum may occur primarily. Where the habit exists of long retaining the urine, or where there is habitual constipation, the anterior or posterior wall of the vagina is gradually pushed forward before the distended organ, lower and lower in the vaginal canal; in this way diverticula of the bladder and rectum are formed, and when these have attained a certain size, they can no longer, usually, be perfectly evacuated; then, in consequence of the continual weight of their contents, the vaginal mucous membrane is displaced still farther downwards.

In rare cases also the posterior vaginal wall may gradually become protruded in consequence of an abnormal pressure in Douglas's cul-de-sac, produced by the bowel or by the presence of ascites or of tumors.

A primary prolapse of the vagina may, by means of the downward traction which it exercises upon the uterus, lead to descent and final prolapse of the latter organ, but only when the connections of the uterus with its neighboring organs are abnormally relaxed. In the absence of relaxation the uterus is unable to follow in the direction of the downward traction, and consequently supravaginal hypertrophy of the cervix results.

Conversely, prolapse of the uterus may be the primary event, and the vagina may be inverted by the descending uterus. The upper portion of the vagina, which envelops the lower segment of the uterus, then appears first in the opening of the vulva. Practically, however, this does not occur just in this way, since when the connections of the uterus are relaxed the vagina, as a rule, is also not firmly united with its surroundings. Therefore, generally, the descent of the uterus is coincident with the

prolapse of the vagina, so that the lower portion of the vagina protrudes beyond the vaginal orifice, while the upper portion is inverted by the descending uterus.

Pathological Anatomy.

Inasmuch as a relaxed vaginal mucous membrane is a condition necessary to the prolapse, we invariably find the evidences of catarrh. This catarrh is then aggravated by the external injuries to which the protruding portions of the mucous membrane are exposed, until finally, through the action of the air and constant friction, the peculiar alteration takes place which was before described under prolapse of the uterus.

A special consideration is due the displacements of neighboring organs, which are apt to be associated with prolapse of the vagina.

Any considerable prolapse of the anterior wall of the vagina is always accompanied by a cystocele (see Fig. 71, on page, 190). This becomes especially marked whenever the abdominal pressure is much increased, and above all in very corpulent women. In such cases we often find in the orifice of the vagina a tense, elastic tumor, as large as an orange, which cannot be kept back by any mechanical means. The highest degree of displacement of the bladder (where the entire bladder is contained in the prolapse) occurs only in connection with coincident prolapsus uteri.

Rectocele may exist in a marked degree without any prolapse of the uterus, in rare cases even without any sinking of the uterus whatever; yet, unless the womb is abnormally fixed in



FIG. 124.

Simple rectocele.

r, The dilated diverticulum of the rectum.

its position, its descent soon follows, in consequence of the constant traction upon it. Fig. 124 represents a case of simple rectocele. The patient herself stated that fæces and flatus escaped into the prolapse. On percussion it was everywhere tympanitic. Figs. 125 and 126 likewise represent a very high grade of rectocele, together with slight cystocele and incomplete prolapse of the uterus.



FIG. 125.

Descent of the uterus, with moderate cystocele (c) and a large rectocele (r).

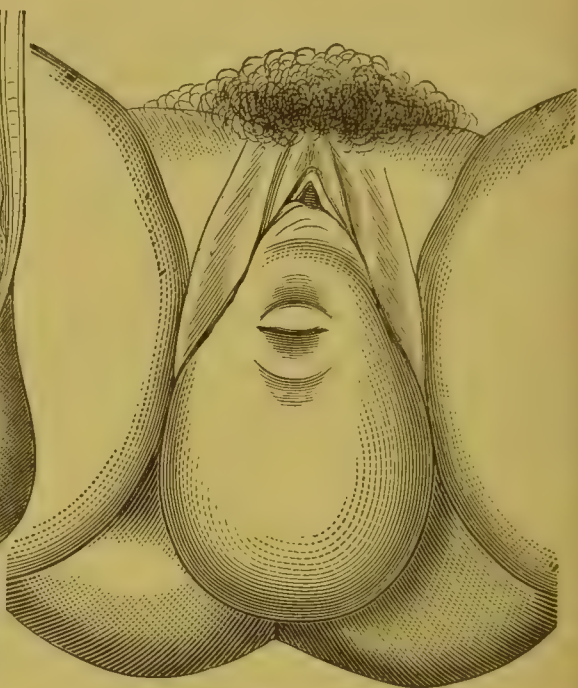


FIG. 126.

Anterior view of the case represented in Fig. 125.

The protrusion downwards of Douglas's cul-de-sac is designated as *enterocele vaginalis* when bowel is contained in it, and *ovariocele vaginalis* when it contains an ovarian tumor. The bowel may exert a considerable degree of pressure upon the posterior wall of the vagina. Fehling¹ has recently reported a case in which the patient, in attempting to replace the large prolapse of the vagina, ruptured the posterior vaginal wall at the cul-de-sac, and died in consequence of the protrusion of intestine which could not be reduced.

¹ Arch. f. Gyn., B. VI., p. 103.

Symptoms

The symptoms caused by prolapse of the vagina are very similar to those of prolapse of the uterus. Occasionally they are only trivial, but pains in the back and the sensation of bearing down are very commonly present. The sensation of a foreign body in front of the vulva becomes very annoying, and a troublesome discharge takes place.

On making an examination we find a tumor between the labia. It can be easily ascertained whether it belongs to the anterior or to the posterior wall of the vagina. If it proceeds from the former we always find a furrow below the orificium urethræ running along the ramus of the pubic arch, though it may be only slight; while in any considerable prolapse of the posterior wall the fossa navicularis will be almost entirely effaced, and the perineum merges directly, without any intervening furrow, into the prolapsus. The finger can be passed in between the two walls of the vagina so as to reach the uterus, which is usually situated low down.

To the discomfort occasioned by the prolapse directly are superadded disorders due to the cystocele or to the rectocele; the former consist of pain and urgent desire to micturate, and the latter depend upon the mechanical distention of the prolapsed part by means of gas or fæces, and frequently also upon irritation of the rectum.

Diagnosis.

It is very easy to ascertain that the prolapse belongs to the vagina both by sight and by touch. We can determine the condition of the uterus by means of the combined method of examination. The cystocele may be recognized by introducing the catheter through the bladder into the prolapse of the anterior vaginal wall, and the presence of a rectocele may be ascertained by passing the finger into the rectum and then hooking it into the diverticulum.

Prognosis.

The prolapse of the vagina is not dangerous in itself, but

extremely tedious, and, as a rule, it is more difficult to treat than a prolapse of the uterus.

The treatment has already been considered sufficiently in speaking of prolapsus uteri.

CYSTS OF THE VAGINA.

Heming, Edinburgh Med. Journ., Jan., 1831.—*Ladreit de la Charrière*, Archives Génér., 1858, Vol. I., p. 528.—*Säxinger*, Spitalzeitung, 1863, No. 39.—*Veit*, Frauenkrankheiten, II. Aufl., 1867, p. 544.—*Winkel*, Archiv f. Gyn., B. II., p. 383.—*Kaltenbach*, Archiv f. Gyn., B. V., p. 138.

Etiology.

With regard to the origin of the vaginal cysts but little is positively known. A true hyperplasia of the connective tissue¹ probably takes place only in consequence of pretty severe bruising of the parts and from extravasations of blood. Gotthardt² gives an account of a cyst which had probably developed from a puerperal thrombus. The first of the cases described by Eustache³ was also doubtless a blood-cyst.

Moreover, in some cases, the cystic development depends perhaps, as Veit supposes, upon a dilatation of the canals of Gärtner—the primitive urinary passages—the persistence of which, however, in the human female can be verified only in very rare instances.

The great majority of the vaginal cysts undoubtedly originate in occluded follicles of the vaginal mucous membrane.

Pathological Anatomy.

The vaginal cysts usually occur singly; rarely several are found together in groups. They proceed most commonly from the anterior or posterior wall, and, as a rule, are situated in the lower third of the vagina. They vary greatly with regard to

¹ Kaltenbach thinks that in the first place accumulations of cells occur in the connective tissue, and from these the cysts lined with pavement epithelium are developed.

² Wiener med. Wochenschr., 1869, No. 94.

³ Montpellier Med. Juin, p. 499.

their contents; sometimes containing clear serum, sometimes a reddish or brownish chocolate-colored, or even greenish fluid, and the contents may also be thick and tenacious. I have myself¹ seen a case of colpohyperplasia cystica in a pregnant woman where the contents of the exceedingly numerous small cysts were gaseous. (Inasmuch as this variety occurs only in pregnant women, it need not here be considered.)

The walls of the cysts may also vary considerably; sometimes they are thick and tough, sometimes quite thin and tender. We find, occasionally, pavement epithelium on the inner surface of the cyst; in other cases there is no epithelial lining whatever. Hall Davis² reports a case in which the cyst had drawn out the mucous membrane in the form of a polypus, so that a pear-shaped tumor hung in the vagina.

Symptoms.

No symptoms whatsoever are produced by the smaller cysts; the larger ones give rise to a catarrh of the vagina, and if situated low down produce the sensation, which always accompanies tumors in the vaginal orifice, of bearing down. Moreover, coitus may become painful or even be rendered impossible. The cysts rarely grow so large as to occasion any hindrance to the passage of urine³ or to interfere with parturition.⁴

The cysts pursue a decidedly chronic course; they grow very slowly, and generally remain small or attain only a moderate size.

Diagnosis.

There is no difficulty in the diagnosis, since the fluid contents of the cysts are indicated by their elastic consistency, and they could be mistaken for ovarian cysts or for a cystocele only in the event of a very superficial examination.

¹ Deutsches Arch. f. klin. Med., 1874, p. 538.

² London Obstet. Tr., Vol. IX., p. 32.

³ Betz, Memorabilien, 1870, No. 3.

⁴ Peters, Monatsschr. f. Geb., B. 34, p. 141.

Treatment.

By puncture or simple incision the contents of the cyst should be evacuated (in one case where the woman was pregnant I have seen abortion follow the puncture!); and, should the cyst fill again, the puncture is to be repeated, and iodine may be injected, or, a piece of the wall of the cyst having been excised, the inner surface may be cauterized. If the sac is so thick that it is possible to enucleate it, its complete extirpation is advisable.

FIBROIDS OF THE VAGINA.

T. S. Lee, On Tumors of the Uterus, etc. London, 1847, p. 245.—*Virchow*, Geschwülste, B. III., Abth. I., p. 220.—*Greene*, British Med. Jour., 1870, May 14.—*Barnes*, London Obstet. Tr., Vol. XIV., p. 309.

Vaginal fibroids or fibro-myomata are rare. Sometimes they become tolerably large, and are comparatively soft. I have seen a vaginal fibroid as large as a walnut, which was situated in the right side of the vaginal cul-de-sac, and was merely covered by the thin mucous membrane. It occurred in connection with a uterine polypus the size of a child's head. There was nothing to justify the supposition that the fibroid had originated in the cervix.

The fibroids give rise to symptoms only when they attain a considerable size, and then their effects are purely mechanical, causing irritation of the vagina and compression of the rectum.

Their extirpation is not particularly difficult.

POLYPI OF THE VAGINA.

Gremler, Preuss. Vereinsz., 1843, 33.—*Scanzoni*, Lehrb., 4. Aufl., 2 B., p. 259.—*Ollivier*, Gaz. des hôp., 1862, No. 95.—*Hoening*, Berl. klin. Wochenschr., 1869, No. 6.—*Jacobs*, Berl. klin. Woch., 1869, No. 25.—*Byrne*, Dublin Quart. Jour., CII., May, 1871, p. 504.

The polypi are always fibroids with narrow pedicles. They may become very large. As soon as they come to lie in the orifice of the vagina they produce great discomfort, even when only of moderate size. As they enlarge they expand the vagina,

and may cause ulceration of its mucous membrane, together with symptoms of compression of neighboring organs.

Their treatment requires an operation the same as that employed in large uterine polypi, yet their removal is generally easier, for the reason that the pedicle is more readily accessible.

CARCINOMA OF THE VAGINA.

Dittrich, Prager Vierteljahrschrift, 1848, 3, p. 102.—*C. Mayer*, Verhand. d. Berliner Geb. Ges., IV., p. 142.—*Martin*, M. f. Geb., B. 17, p. 321.—*Baldwin*, Phila. Med. Times, December 15, 1870.—*Godell*, Boston Gyn. Jour., Vol. VI., p. 383.—*Eppinger*, Prager med. Vierteljahr., 1872, B. 2, p. 9.—*Parry*, Am. Jour. of Obstet., Vol. V., p. 163, and Phila. Med. Jour., 1873, Feb. 1.

Pathological Anatomy.

Primary carcinoma of the vagina is very rare. With the secondary form, which is so commonly met with as the result of an extension from the cervix on to the upper portion of the vaginal cul-de-sac, we are not here concerned. The carcinoma may either occur as a diffuse infiltration of the vaginal mucous membrane, the normal mucous membrane being replaced by irregular hyperplastic growths, which sometimes render the entire walls of the canal rigid, or a circumscribed tumor may be developed, which, springing from a single spot, projects into the vagina in the shape of a hemisphere. The vaginal carcinoma may also extend secondarily to the neighboring organs.

I have myself seen a case where in all probability a primary cancer of the vagina was the source of a local infection of the posterior lip of the cervix, brought about very probably by its rubbing against the vaginal tumor. The patient was a woman, forty-one years of age, who had had seven children, and once had aborted. The carcinoma formed a large tumor, which projected from the posterior wall into the vagina. While the vaginal cul-de-sac was entirely free, the posterior lip of the cervix appeared eroded, somewhat fissured, friable, and suspicious-looking. The mucous membrane of the rectum was freely movable over the tumor. Three and a half months after excision had been performed by Veit, a relapse occurred, which involved the posterior lip most markedly, together with the entire vault of the vagina and its posterior wall.

The symptoms are quite similar to those of cervical carcinoma. In addition to the pain, which may be very slight, there

is a discharge of blood and offensive serous matter. Occasionally the symptoms of a tumor in the vagina become prominent, such as pains in the back and a sensation of bearing down. Later, manifestations of the cancerous cachexia are superadded.

The *treatment* is the same in principle as that employed in cervical carcinoma. An operation is not only indicated in those cases where a complete extirpation of the new growth is to be expected, but it often proves to be a better way of controlling the foetid discharge and hemorrhage than by an excision, either with the knife, scissors, *écraseur*, galvano-cautery, or with sharp scoops followed by cauterization of the base.

SARCOMA OF THE VAGINA.

Meadows, London Obstet. Tr., Vol. X., p. 141.—*Smith*, Am. Jour. of Obstet., Vol. III., p. 670.—*Frau Kaschewarowa*, Virchow's Archiv, B. 54, p. 73.—*Spiegelberg*, Archiv f. Gyn., B. 4, p. 348.

The same two forms of sarcoma occur in the vagina as in the uterus, namely, in the form of a diffuse infiltration of the walls or in that of a circumscribed tumor resembling a fibroid, or occasionally more in the shape of a polypus.

The symptoms of sarcoma, therefore, may either resemble those of carcinoma, or those of the benign tumors of the vagina.

Operative *treatment* is necessary, particularly in the fibroid form, and it is worthy of note that in one instance a perfect recovery was observed by Spiegelberg.

TUBERCULOSIS OF THE VAGINA.

Klob, Pathol. Anat. d. weibl. Sexualorg., p. 432.

Only two cases of this affection have been described (by Virchow and Klob); in these, tubercles and tubercular ulcers were found upon the vaginal mucous membrane, in connection with tuberculosis of the urinary organs, and of the liver, lungs, and bowels.

FOREIGN BODIES IN THE VAGINA.

Klob, Path. Anat. d. weibl. Sexualorg., p. 432, and *Hyrtl*, Topogr. Anatom., 4. Aufl., B. 2, p. 167.

From a practical stand-point, pessaries are among the most important foreign bodies found in the vagina. With only moderate pressure they cause thickening of the epithelium, and if the pressure is more considerable ulceration may be produced. When they press continuously upon one spot for a long time they gradually erode the mucous membrane, and may cut deep furrows into the subjacent cellular tissue. Granulations growing through the opening of the pessary may even completely embed one side of the instrument. The ulceration may also lead to perforation into the bladder or rectum.

Where a uro-genital fistula exists, calculi may occasionally be found in the vagina as foreign bodies.

Furthermore, there are abundant instances on record where foreign bodies of the most diverse description have been introduced purposely into the vagina, sometimes by the patients themselves, for the sake of masturbation, and sometimes maliciously by other persons. Among the foreign bodies of this class, such articles as pomade pots, curling sticks, needle-cases, drinking glasses, pine cones, and the like, are mentioned in the literature of the subject. *Pearse*¹ found a thread-spool in the vagina of a woman thirty-six years of age, which had been there for twenty-two years, and had produced a urethro-vaginal fistula. It is remarkable that the woman had been twice married without the presence of the foreign body ever having been suspected. But probably the strangest foreign body ever discovered in the vagina was one found by me—a cockchafer lying beside a pomade pot.

ENTOPHYTA AND ENTOTZOA.

Donné, Recherches microscopiques sur la nature, etc. Paris, 1837.—*Kölliker* u. *Scanzoni*, Scanzoni's Beitr., 1855, II., p. 128.—*Küchenmeister*, Woch. d. Zeitschr. d. Ges. d. Wiener Aerzte, 1856, No. 36.—*L. Mayer*, Mon. f. Geb., B. 20,

¹ British Med. Jour., June 28, 1873.

p. 2.—*Winkel*, Berl. klin. Woch., 1866, No. 23.—*Haussmann*, Die Parasiten d. weibl. Geschl., etc. Berlin, 1870.

Aphaphytes (*oidium albicans*) are not infrequently found upon the mucous membrane of the vagina. Sometimes they give rise to no symptoms whatever, but in other cases they cause a redness of the mucous membrane, together with a rather free discharge, and sometimes an exceedingly annoying itching.

The *trichomonas vaginalis*, an infusorium which is met with often enough in the vagina, is of no importance whatever.

In little girls the *oxyuris vermicularis* sometimes finds its way into the vagina from the rectum, and produces violent itching.

INJURIES OF THE VAGINA.

It is rather uncommon for the vagina to meet with an injury, excepting during parturition or through surgical procedures. Serious wounds have sometimes been made by the horn of a cow or by falling upon some sharp-pointed object. Thus, James¹ reports a case where a woman was impaled upon the prong of a hay fork, which passed between the cervix and rectum, and penetrated the body as far as the ribs. The case terminated in recovery. Gotthardt² met with a case of spontaneous rupture from a fall. We have already considered sufficiently the injuries to the vagina produced by pessaries.

Injuries to the vagina are most frequent during parturition. We can only speak here of the effects which they leave behind. These may consist in a marked stenosis or even atresia of the vagina, or, occasionally, in other deformities of the vagina and vaginal portion of the cervix. Thus in one case I have seen the vaginal portion, which had been torn off transversely from the cervix, heal in such a way that when the sound was passed into the external os it came out at the transverse fissure that still remained unhealed.

Of all the forms, however, of solution of continuity in the vagina, by far the greatest importance attaches to those fistulæ

¹ Boston Gyn. Jour., Vol. III., p. 175.

² Wiener med. Wochenschr., 1869, No. 94.

of the vagina, which communicate with neighboring organs ; and, inasmuch as we also include here fistulæ which do not pertain to injuries of the vagina, we shall proceed to speak of the uro-genital fistulæ in general.

Uro-Genital Fistulæ.

F. C. Naegle, Erf. und Abh. a. d. Geb. d. Krankh. d. weibl. Geschlechts. Mannheim, 1812, p. 367.—*Dieffenbach*, Oper. Chirurgie, I p. 546, and Preuss. Vereinsz., 1836, Nos. 24, 25.—*Jobert*, Lancette française, 1834, No. 102, etc. ; Gaz. med. de Paris, 1836, No. 10, etc. ; Gaz. des hôp., 1850, No. 54 ; and Traité des fistules, etc. Paris, 1859.—*Wutzer*, Organ f. d. ges. Heilkunde, II, 4. Bonn, 1843, and Deutsche Klinik, 1849, Nos. 3, 4.—*Chelius*, Ueber d. Heil. d. Blasen-Scheidenfisteln durch Cauterization. Heidelberg, 1844.—*Von Metzler*, Prager Viertelj. f. prakt. Heilk., 1846, B. 2, p. 126.—*Marion Sims*, Amer. J. of Med. Sc., January, 1852, p. 59, and Silver Sutures in Surgery. New York, 1857.—*Roser*, Archiv f. phys. Heilkunde, 1854, p. 576.—*G. Simon*, Ueber d. Heil. d. Blasenscheidenfisteln. Giessen, 1854 ; Deutsche Klinik, 1856, Nos. 30-35 ; M. f. Geb., B. 12, p. 1 ; Scanzoni's Beitr. B. IV., p. 170 ; Ueber d. Operation d. Blasenscheidenfistel, etc. Rostock, 1862 ; Prager Vierteljahrschrift, 1867, B. 2, p. 61 ; Deutsche Klinik, 1868, Nos. 45, 46.—*Esmarch*, Deutsche Klinik, 1858, No. 28.—*W. A. Freund*, Breslauer klin. Beitr., 1862, H. 1, p. 33.—*Rose (Wilms)*, Charitéannalen, B. XI., p. 79.—*Baker Brown*, Surg. Diseases of Women, 3 ed., p. 133, and Lancet, March, 1864.—*Bozeman*, Louisville Review, January, 1856, and New Orleans Med. and Surg. J., March and May, 1860.—*Ulrich*, Zeitschr. d. Ges. d. Wiener Aerzte, 1863, H. 2-4, and Woch. d. Ges. d. Wiener Aerzte, 1866, Nos. 1-10.—*Heppner*, M. f. Geb. B. 33, p. 95.—*Kaltenbach*, in Hegar's Sterblichkeit während Schwang., etc. Freiburg, 1868.—*Weiss*, Prager Viertelj., 1872, B. 3.—*Karl Braun*, Wiener med. Woch., 1872, No. 34.—*Emmet*, Amer. J. of Med. Sci., October, 1867, p. 313, and Vesico-vaginal Fistula, etc. New York, 1868.—*Spencer Wells*, St. Thomas's Hospital Reports, 1870.—*Hayes Agnew*, Lacer. of the Fem. Perineum and Vesico-Vaginal Fistula. Philadelphia, 1873.

History.

During almost the whole of the first half of this century the vesico-vaginal fistulæ were considered as among the very worst difficulties to remedy. Cauterization effected a cure only in very exceptional instances, and the operation of freshening the edges and applying sutures was unsuccessful, as a rule, even in the most skilful hands (*Wutzer* and *Dieffenbach*). A decided advance in the operative treatment of these fistulæ has been

made by Sims and Simon. The most valuable part of their achievements consisted in making the fistulæ more perfectly accessible. The great merit due to Sims, and the good results attainable by the "American method," are by no means to be ascribed, as claimed in America and England, to the use of the silver-wire suture, but almost exclusively to the invention of the duck-billed speculum, and to the facility thereby afforded for paring the edges more perfectly, and for the more accurate adjustment of the sutures. Through a modification of the speculum Simon has succeeded in making the most deeply situated fistulæ perfectly accessible, and by improving, and, more especially, by simplifying the method of freshening the edges and of applying the sutures, not to mention certain improvements in the after-treatment, he has so perfected the operation that there are very few fistulæ now which cannot be made to close by healing.

Etiology.

By far the most common cause leading to the production of uro-genital fistulæ arises from bruising of the soft parts during parturition, in consequence of which gangrene ensues.

If, in cases of narrow pelvis, but also, exceptionally, where other disproportionate dimensions exist (such as may arise from the great size or false position of the foetus, from a frontal presentation, etc.), the labor is protracted, the compression of the maternal soft parts between the presenting portion of the foetus and the pelvic bones may be so great as to cause mortification, in consequence of which a slough is formed which separates in the course of a few days, leaving a communication between the urinary organs and the genital canal.

The long duration of the pressure is especially important, since a momentary squeezing of the soft parts, even though very severe, is not apt to produce mortification, while a pressure which is very long continued does not need to be so very great to produce the injurious effect.

A very severe pressure hardly ever takes place before the waters have escaped, for until then the force acting directly upon the child is very slight. Hence, labors which are very

long protracted after rupture of the bag of waters, the head presenting, rank first in importance in the causation of fistulæ.

From what has been said it is readily seen that fistulæ are most apt to originate in the natural course of labor. Much more rarely are they attributable to instrumental aids; in fact it may even be said that the majority of fistulæ are owing to the neglect or too late performance of an operation.

Fistulæ are seldom produced by the pressure of the forceps or of the cephalotribe alone, unless the blade which produces the fistula lies unusually far forwards, and the operation is inordinately prolonged. But those instruments which compress the head (among which in difficult cases the forceps must unquestionably be included) may indirectly do damage by so squeezing the head together laterally that the pressure of the latter upon the soft parts covering the anterior wall of the pelvis is greatly increased. If the head yields to the traction of the forceps, and the extraction of the child is not long delayed, this brief increase of the pressure will still be less dangerous than if the head were suffered to remain fixed in one place; but if the forceps are applied unsuccessfully, and the head remains fixed in position, notwithstanding forcible tractions are made, the parts where the pressure occurs will be completely crushed.

Other causes than the above give rise to fistula much more rarely.

Occasionally, the wall intervening between the urinary and genital canals may be lacerated during labor, or it may be cut through by one of the rather sharp blades of the forceps standing out somewhat from the child's head. Moreover, it may be torn through by a sharp, cranial bone projecting from the skull of the child after perforation has been performed. Occasionally attempts at introducing the catheter result in a perforation.

Other traumatic causes may produce a fistula, as, for example, a fall upon some sharp-pointed object, or certain gynecological operations such as opening a hæmatometra.

Again, pessaries may give rise to a perforation from the vagina into the adjoining hollow organ, while calculi in the bladder may cause it from the other direction. Thus Simon¹

¹ Arch. f. klin. Chirurg., 1870, XII., p. 573.

operated upon a very large fistula in an eight-year-old girl, which had been caused by a calculus.

It is very seldom that a parametritic abscess which perforates both ways leaves a communication between the two organs.

It is also very rare for ulcerations of the vesical mucous membrane to cause a perforation into the vagina. Lawson Tait¹ reports three such cases, of which two were under treatment at Simpson's clinic. The ulceration which leads to perforation into the vagina develops in the course of a chronic catarrh, and, accompanied by extreme tenesmus, may extend so far as ultimately to destroy the greater portion of the vesical mucous membrane. The production artificially of a vesico-vaginal fistula, with the object of curing this condition, as well as for the treatment of chronic cystitis generally, through preventing any stagnation of the urine, was recommended, before Simpson, by surgeons in America. It was first performed, in the male, by Willard Parker (1850),² then by Emmet³ and by Bozeman.⁴ I have myself observed one case of perforating vesical ulcer, in which the perforation developed almost under my very eyes, having been preceded for some time by ardent desire to micturate, together with the presence of albumen, pus, and blood in the urine. The patient became cachectic, and soon afterwards died outside the hospital. An autopsy was not permitted.

We will here merely allude to the fistulæ which not infrequently develop in connection with extensive corroding carcinoma of the cervix.

Pathological Anatomy.

The fistulæ which are caused during parturition may, depending upon the position which the several organs occupy at the time the pressure is exerted, affect the two canals in the most various situations. It is the position of the organs, and not the different heights at which the pressure takes place, that

¹ Lancet, 1870.

² New York Journal of Medicine, Vol. XVI.

³ Am. Practitioner, February, 1872.

⁴ Am. Jour. of Obstet., Vol. III., p. 636.

produces the great variety in the situations of uro-genital fistulæ. Almost without exception the pressure occurs at the superior posterior border of the symphysis, or rather at the bony prominence lying near the pubic articulation; only very exceptionally does it take place against the side of the pubic arch. Now the fact that, while the situation of the pressure nearly always remains the same, so many organs are nevertheless implicated by it, depends upon the great variations in the relative position which the bladder and genital canal may assume to one another during delivery.

The bladder, as a rule, is so situated as to rest upon the posterior superior angle of the symphysis, so that in the great majority of instances a vesical fistula is developed. But sometimes the bladder, when distended, rises so high above the symphysis that the orificium urethræ does not lie below but behind the symphysis, and hence the urethra becomes exposed to the pressure, in consequence of which a vagino-urethral fistula results.

But the bladder may also in rare instances lie so deep in the true pelvis that its summit falls below the point of pressure. In this case, of course, a urinary fistula cannot be produced; but, if there is sufficient pressure to crush the tissues, it is the peritoneum which is involved and a peritoneal perforation is the result.

But the different parts of the genital canal are subject to similar variations in their position during delivery.

The fistula never leads into the cavity proper of the uterus, since at the time when the pressure takes place the internal os always lies high above the symphysis.

The anterior wall of the cervix may, however, lie within the constricted portion of the canal, and, in the case of a decidedly small pelvis, may be caught and crushed between the head and the pubic arch. In this event a communication is formed between the bladder and cervix.

The crushing of the soft parts, which causes mortification, generally takes place after the pains have already been energetic for some time, and the external os has receded over the head of the child, bringing the vaginal wall, consequently, into contact

with the posterior superior border of the symphysis. A vesico-vaginal fistula is then formed.

Of course the very edge of the anterior lip of the os may be involved in the pressure, and a certain portion of it may also become crushed.

After what has been said, it will be understood in what manifold forms the uro-genital fistulæ may occur.

To briefly recapitulate, the commonest form is the communication between the bladder and the vagina—the vesico-vaginal fistula. Urethral fistulæ occur only exceptionally.

The vesico vaginal fistula may be seated high up in the vaginal cul-de-sac; if it is situated so high up that the anterior lip of the os, which in other respects remains sound, forms its posterior edge, it is designated as superficial vesico-utero-vaginal fistula. If the anterior lip of the os is also in part destroyed, so that the vesical fistula opens both into the cervical canal and into the vagina, it is termed deep vesico-utero-vaginal fistula. If, when the injury occurred, the external os was situated below the point of pressure, a vesico-cervical fistula is produced, the vagina remaining intact.

Still another form of the uro-genital fistulæ may very rarely occur, namely, when neither bladder nor urethra is involved, but an opening is made into the ureter. According as it communicates with the vagina or with the cervix, a uretero-vaginal or a uretero-uterine fistula is developed.

In very rare instances vesico-rectal fistulæ have been observed in women. Simon¹ saw a case following a difficult labor. The upper two-thirds of the vagina was occluded. Vesico-rectal fistulæ are doubtless more frequently due to the simultaneous perforation of parametritic abscesses into the bladder and the rectum, two instances of which are reported by Simpson.²

The fistulæ differ from one another somewhat, according to the organs which they implicate.

The vesico-vaginal fistulæ almost always consist of simple roundish openings, whose edges are occasionally quite thin and sharp, but in other cases everted, thickened, and callous. Their

¹ Arch. f. klin. chir., B. 15, p. 111.

² Obstet. and Gynecol. Works. Edinburgh, 1871, pp. 814 and 816.

shape is mostly roundish or oval; less frequently crescentic or slit-shaped. Their size is very variable; sometimes they are so small that they can scarcely be found, in other cases the intervening wall between the bladder and vagina is almost

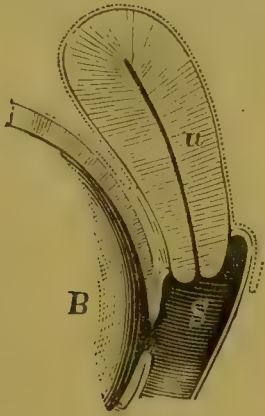


FIG. 127.

Vesico-vaginal fistula.

u, Uterus; S, vagina; B, bladder.



FIG. 128.

Superficial vesico-utero-vaginal fistula.

entirely destroyed, the two hollow organs forming virtually but a single cavity. Where the fistula is not very small the vesical mucous membrane is apt to protrude through the perforation into the vagina.

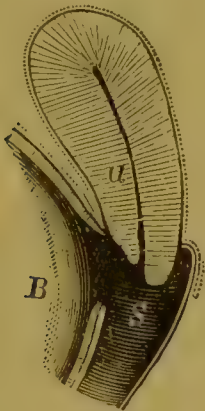


FIG. 129.

Deep vesico-utero-vaginal fistula.

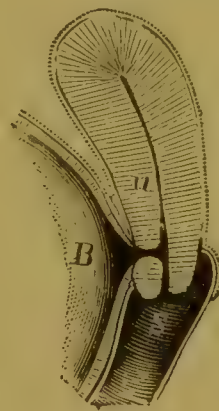


FIG. 130.

Vesico-cervical fistula.

The urethro-vaginal fistulæ are likewise of variable size, the opening being sometimes very fine, and at other times almost the entire posterior wall of the urethra being destroyed.

In the uretero-vaginal fistulæ the opening is situated high up in the vagina, on one side, and is always very small.

Stricture or occlusion of the urethra may occur as a complication of the fistula, induced in consequence of disuse, or caused by the same injury which led to the development of the fistula.

In the same way constriction or atresia of the vagina may be associated with the fistula, so that an exceedingly complicated state of things may be produced.

Symptoms.

Immediately after delivery there are no characteristic symptoms, for the simple reason that the fistula has not yet developed. The symptoms which present themselves are ordinarily such as are wont to occur after difficult labors accompanied by injuries of the soft parts. Retention of the urine is very commonly present, and often persists for a long time. But this is in no way characteristic, since it is quite apt to occur in puerperal women, and furthermore, is wanting in many cases where a fistula has developed. An incontinence due to a paralysis of central origin is exceedingly rare.

The really characteristic symptom is the continual escape of urine through the vagina, and this does not make its appearance until the slough, into which the bruised tissue has been transformed, has separated. Several days always elapse before this takes place, so that an involuntary discharge of urine cannot be expected before the third day.

It is not unusual to find that so long as certain positions of the body are quietly maintained, the urine remains in the bladder. This is either owing to the fact that the edges of the fistula (which in this case is usually slit-shaped) are brought closely together, or else that the orifice of the fistula is obstructed by the posterior vaginal wall or by the cervix. Under these circumstances the urine may be evacuated naturally.

The urethro-vaginal fistulæ have far less serious consequences, since the urine is retained normally; it is only during micturition that, instead of flowing through the orificium urethræ, it escapes by the fistulous opening into the vagina.

Where only one uretero-vaginal fistula exists, the urine

secreted by one kidney is evacuated normally, while that from the other dribbles involuntarily through the fistula.

In consequence of the involuntary discharge of urine the patient suffers great annoyance and distress. She is constantly wet, and the continual dribbling of the acrid urine over the vulva and the skin of the thighs produces cutaneous inflammations. In addition to this, a strong odor of urine is emitted from the patient's person, which excludes her from society, and compels her to lead a tormented, pitiable existence.

The capacity for conception, however, is not materially impaired. These women not infrequently become pregnant; gestation runs its normal course, and the labor does not differ from what, in view of the disproportionate dimensions, we should be led to expect.

Diagnosis.

There is no difficulty in recognizing the vesico-vaginal fistulæ, provided a thorough examination is made. Tolerably large fistulæ may even be felt with the finger, and if a metallic catheter is also introduced into the bladder, the hole may be discovered when the fistula is quite small. Where the fistulæ are very minute, the sense of sight must be brought in to aid the diagnosis. Sims's speculum is introduced, and the anterior vaginal wall is carefully inspected, the folds and hollows being exposed to view by means of sharp hooks. In case the fistula cannot be discovered in this manner, as happens only when it is extremely fine and so situated as to be somewhat concealed, recourse must be had to injections of the bladder with colored fluids (milk, India ink, etc.).

But notwithstanding the diagnosis is generally so simple, and though by means of Simon's specula it is possible to determine the location, size, and other characters of the fistula so accurately, yet, in complicated cases, especially where there is a stricture of the vagina present at the same time, it may be a matter of considerable difficulty to ascertain the precise condition of things. The difficulty is greatest when the vagina is closed just beyond the vaginal orifice, and the obstructing wall is perforated with one or more small openings through which the

urine flows. Under such circumstances it may be almost impossible to ascertain what the condition is in the upper portion of the vagina and in the bladder. Moreover, it may be a difficult matter to determine what the state of the uterus is, whether it also is occluded (for this has an important bearing upon the operation), and the question is rendered all the more difficult from the fact that the menses often remain absent after severe puerperal processes. In one case of this sort I found two openings in the occluded vagina from which the urine flowed, and one of them conducted into the upper portion of the vagina where there was a communication with the bladder, while the other led into the bladder directly. The fact that the uterus was pervious could only be ascertained, after repeated trials, by directing the sound, which had been introduced into the rectum, against the external os.

It is possible to distinguish the urethral fistulæ, on account of their being situated low down, and because the urine can be evacuated through them voluntarily.

Fistulæ of the ureter may be recognized from the fact that the probe passes in the direction of the kidney, and because when colored solutions are injected into the bladder, colored urine does not flow from the fistula. When the latter is closed up, violent symptoms of acute hydronephrosis at once supervene, which disappear again so soon as the fistula is again made pervious.

Prognosis.

Generally speaking the prognosis is not unfavorable.

Not infrequently recent fistulæ heal spontaneously. After the slough into which the bruised wall has been transformed has separated, the edges of the wound begin to granulate from the lines of demarcation, and thus, under favorable circumstances, may fill up the perforation. This process appears to take place more readily in vesico-uterine fistulæ, since then the fistulous passage is of some length and the granulations therefore have a better chance of closing it. I have seen such a case occur after a frontal presentation, where the fistula healed rapidly during childbed.

In other cases a comparatively natural cure may take place, in that through the same process by which the fistula was caused the vagina may be occluded, an atresia vaginæ being produced below the fistula. Then, of course, the urine, and the menstrual blood too, must seek exit by way of the urethra.

But if it is a tolerably old fistula it is not apt to heal naturally, at least the vesico-vaginal fistulæ with sharp edges are not; nevertheless the irritation caused by the uterus, the presence of urinary concretions, or the forced passage of a urinary calculus, may occasionally provoke the development of granulations, and in this way cause a closure of the fistula. A momentary disappearance of the flow of urine, caused by obstruction of the fistula by a calculus, is of no especial importance.

At the present day, by virtue of the modern operative treatment of fistulæ, the prognosis is favorable even in old cases; for fistulæ that cannot finally be closed after repeated attempts are extremely rare. It is true, however, that the prognosis of the operation depends largely upon the skill and practice of the operator.

Treatment.

In recent cases, if the walls of the fistula are still granulating, Nature's efforts to close the wound are to be assisted. This may be done by introducing the catheter and leaving it in the bladder, so that the urine may not collect there; in this way the flow of urine through the fistula may in great measure be prevented. The union of the edges of the wound can often be promoted by introducing into the vagina a suitable tampon, which tends to force the sides of the fistula into coaptation. If the fistula is pretty old, and its edges have completely cicatrized, it can only be closed by converting its edges into raw surfaces again.

This may be accomplished in two ways. In the first place, the edges of the fistula may be stimulated to granulate by means of cauterization, so that the fistula will again have the same chance of healing as at the commencement of the puerperal state. But the larger the fistula, so much the less prospect is there of the granulations closing the wound. Therefore it is only in the case of quite small fistulæ that cauterization with the

nitrate of silver or the hot iron merits a trial, and even then it often enough fails. But there is a decided objection to severe cauterization of the edges of the fistula, inasmuch as the surrounding tissue is thereby converted into a hard cicatrix, which greatly diminishes the chances of success in the more radical method of cure, which we shall now proceed to describe.

This method consists in *freshening the edges of the wound and uniting them by means of the suture*. Simon has brought this operation to a remarkable degree of perfection; and in describing the technical points of the method we shall, in the main, follow his directions.

An extremely important condition to the success of the operation consists in exposing the fistula to view to the fullest possible extent. The patient lies in an exaggerated lithotomy position; the legs are held by two assistants, and are strongly flexed on the body, so that the vulva is well elevated. Then, by pressing the posterior wall of the vagina as far back as possible with the duck-billed speculum, and the lateral walls (which are still somewhat inclined to fall inward) being kept back by bent spatulæ, and finally that portion of the anterior wall which lies below the fistula being lifted up by means of a flat-shaped speculum, the fistula will be fully exposed to view, or, at any rate, with the aid of little hooks, it may be rendered perfectly accessible.

When the fistula is situated pretty low down, and the uterus is very mobile, the former may sometimes be brought down in front of the vulva by forcibly dragging down the womb.

I operate invariably with the patient under the influence of an anæsthetic; for although the operation of preparing the edges and of applying the sutures is not very painful, yet it is always possible with anæsthesia to dilate the vagina more perfectly by means of the specula; others, however, operate without chloroform.

The fistula having been rendered thoroughly accessible, we should proceed to freshen the edges. In doing this, care must be taken to remove all of the callous and but slightly vascular portions, and the freshened edges should be smooth and tolerably wide, and should consist of normal tissue. To this end a pointed

knife is entered about a fifth of an inch or more from the margin of the fistula, in such a manner that its point emerges just at the edge of the vesical mucous membrane; or, as advised by Simon, even within the mucous membrane of the bladder. If now the edges of the fistula are pared in this way all the way around, the fistula will be converted into a large funnel-shaped wound, with its narrowest part towards the bladder. In order to make the incision at the same distance from the margin of the fistula all around, it is well, beforehand, to mark out with the knife the line which it is to follow in the mucous membrane. Simon removes a good portion of the vesical mucous membrane in paring the edges, but this is hardly necessary, and is liable to give rise to troublesome hemorrhage from the bladder afterwards. If the sides of the funnel-shaped wound are not too steep, but the incision is made rather flat, in accordance with the American method, in which a large area of the vaginal mucous membrane is cut away, the edges of the fresh wound will be very broad, and, unless there is great tension, may be brought into perfect coaptation.

In case the surfaces of the wound are not left quite smooth, or little islands of mucous membrane are found remaining here and there, these can be trimmed off afterwards with the knife or with curved scissors.

The bleeding is stanchd by means of cold water; spurting arteries are either twisted or ligated; but, if possible, all the ligatures are removed before the wound is finally closed.

The edges of the fistula having been freshened, the next thing is to close the wound. Unless there be some especial objection to it, the upper and lower edges should be united together, so that the resulting cicatrix may run transversely. The silver-wire suture possesses no advantages whatever over good, smooth, silk thread. The sutures are introduced by means of short, sharply curved needles, which are grasped by means of the needle-holder. The mucous membrane of the bladder is either not included at all in the suture, or only to a very slight extent. All of the sutures having been inserted (and they should be placed tolerably near to each other) we proceed cautiously to tie them. If the edges of the wound do not everywhere come

into good coaptation, superficial sutures are applied in the intervening spaces between the others. Stitches or incisions for the purpose of relieving tension are unnecessary.

After the operation the patient must lie quietly in bed for eight days, during which time no interference is necessary; not even the catheter should be passed, unless the patient is unable to urinate of her own accord. From the fifth to the sixth day the sutures are cautiously removed.

The above method of procedure may easily be modified. For example, it may be necessary, previous to the operation, to divide adhesions or cicatricial strictures in the vagina. It is exceedingly rare that the prolapsed mucous membrane of the bladder becomes adherent to the posterior wall of the vagina, so that they have to be separated with the knife.

When the defect is very large, it is often necessary to join the edges in complicated T- or Y-shaped figures.

It is particularly disagreeable to be obliged, before operating, to overcome a stricture or atresia of the vagina.

Great care should be taken not to include the ureters in the sutures, for they occasionally lie just to one side of the fistula. Seeing bloody urine escape from the ureters, *per saltem*, it might be possible for the operator to mistake them for spurting arteries. As soon as they are discovered they should be avoided as carefully as possible while paring the edges of the fistula, and especially when applying the stitches, for should they be included in the latter, acute hydronephrosis would be the result.

The operation is not ordinarily dangerous to life, since only very exceptionally (in deep, vesico-utero-vaginal fistulæ) does the peritoneum come within reach of the knife, and pyæmia is an exceedingly rare sequel.

A very unfortunate accident, which may complicate the operation, is hemorrhage from the bladder. It may be so copious that the bladder reaches to the navel, and symptoms of a high grade of anæmia are induced. But little can be done for it therapeutically; applications of cold to the abdomen or within the vagina do but little good, and injections of ice-water or styptic solutions into the bladder itself may do direct injury, since they tend to augment the contents of the bladder and increase the

vesical spasms. The operation usually proves a failure under these circumstances, for the contractions of the bladder continue until the coagula are forced out through the wound.

Very often a little fistula is left, after the operation, in one corner or in the centre, which then demands a separate operation, unless an effort be made to close it by cauterization.

If the fistula is situated high up in the vicinity of the anterior lip of the os, or in case it is a superficial vesico-uterine fistula, the anterior lip itself must be pared and united with the anterior edge of the wound.

Cases, however, occur in which an operation upon the fistula is impossible. This may be so because the fistulous opening is too large, though the operation has succeeded in some very large fistulæ; or one edge of the fistula may be drawn over so far towards the pelvic wall, in consequence of cicatricial contraction, that it is impossible to freshen it or to bring it forward so as to fill up the defect. Moreover, uterine fistulæ, which are generally inaccessible, cannot, as a rule, be operated upon.

In this event, in order to obviate the involuntary discharge of urine, *the transverse obliteration of the vagina*, according to the method of Simon, may be performed.

This consists in freshening the anterior and posterior walls of the vagina at corresponding points as high up as possible, though, of course, below the fistula, and then uniting them together. By this means an enclosed space is created above the point of occlusion, which communicates through the fistula with the bladder, and the contents of which (consisting of mucus and menstrual blood), together with the urine, can escape only by way of the urethra. Through this

procedure the principal evil consequence of the fistula, viz., the involuntary discharge of the urine, is prevented. Hence, in those cases where any other method of relief is impracticable, this operation decidedly merits a trial. It was performed by me in the case mentioned above. I first operated upon the fistula at the



FIG. 131.

Large vesico-utero-vaginal fistula, with transverse obliteration of the vagina.

v, vagina; b, bladder, the two communicating by means of the fistula; s, blind lower extremity of the vagina; o, point of the obliteration.

bottom of the stenosed vagina, and then converted the stenosis into a complete occlusion.

To be sure, if we regard the results accomplished, the transverse obliteration of the vagina is a very different matter from the cure of the fistula itself, since, in consequence of the obliteration, the capacity for conception is always sacrificed, and the ability to have connection is, to say the least, considerably diminished. Nevertheless, the operation may become indispensable, for the condition of the patient while suffering from the fistula is simply intolerable; of course, in old women it may be resorted to without hesitation.

The theoretical danger of disorders ensuing in consequence of the stagnation of the urine behind the occluded spot, and from the passage of menstrual blood through the bladder and urethra, is found by experience practically not to exist. In the case of an inaccessible uterine fistula the external os may be closed, instead of the vagina, by freshening the anterior and posterior lips and then sewing them together.

Furthermore, in the fistulæ of the ureter, the transverse obliteration of the vagina offers the only possible means thus far known of effecting a cure. If the vesical end of the ureter is closed, it is necessary first to create an artificial vesico-uterine fistula, and then to occlude the vagina below this point.

In deeply situated vesico-utero-vaginal fistulæ, with a large defect in the anterior lip, we may have to unite the posterior lip with the anterior wall of the vagina. The vagina then remains open for purposes of coition, though conception is impossible, and the menses have to pass off by the urethra.

But should even transverse obliteration be impracticable, the patient is in an extremely unfortunate condition; no artificial apparatus has yet been devised that perfectly fulfils the object of collecting the urine.

VAGINO-INTESTINAL FISTULÆ.

Simon, Prager Vierteljahrschrift, 1867, B. 4, p. 1.—*Simon*, Mon. f. Geb., B. 14, p. 439.—*Heine*, Archiv für klin. Chir., XI, 1870, p. 485.

Etiology.

An abnormal communication between the rectum and vagina,

hence a *recto-vaginal fistula*, occurs most commonly, too, in consequence of parturition, though not in the same manner (through mortification due to pressure) as the vesico-vaginal fistulæ, but most usually under circumstances where large perineal ruptures have extended into the septum recto-vaginale, and only the thicker portion of the perineum has afterwards healed, leaving the thin vagino-rectal wall still open. I have seen a double perforation into the rectum occur in childbed, from deep-seated diphtheritis of the posterior vaginal wall. Exceptionally the recto-vaginal wall may also be torn through by instruments used during delivery or by clyster syringes. It is very seldom that other injuries, such as falling upon some sharp-pointed object, are the cause of the fistula. Perforation by means of a neglected pessary is a rare accident; the same is true of a fistula resulting from an abscess in the vaginal wall, which perforates both ways.

We pass over here the perforation between the rectum and the vagina, which is occasioned by cancerous disintegration.

Fistulæ of the small intestine may occur in consequence of a laceration of the posterior arch of the vagina during parturition, giving rise to a protrusion of a knuckle of intestine through the opening, followed by strangulation, gangrene, and sloughing of the prolapsed bowel; or, a coil of intestine, lying in Douglas's cul-de-sac, may be seriously compressed, and a previous adhesion between it and the posterior arch of the vagina having occurred, a perforation may take place through the latter. In the former case, an anus præternaturalis is developed in the posterior vaginal arch; in the latter, a fistula.

Pathological Anatomy.

The recto-vaginal fistulæ vary greatly in size; sometimes they are exceedingly small, and merely the intestinal gas escapes, while in other cases almost the entire vaginal wall is destroyed.

Symptoms.

Their characteristic symptom is the escape of contents of the bowel through the vagina. In the case of rectal fistulæ,

according to their size, either the whole amount of the fæces are passed involuntarily through the vagina, or simply the fluid portions; sometimes only flatus escapes. In fistulæ of the small intestine it is the thin, bright yellow pultaceous matter, consisting of the digested food, which is evacuated.

The effects of the involuntary fecal discharges naturally cause great annoyance and distress.

Diagnosis.

The examination is performed in the same manner as in the case of the vesico-vaginal fistulæ, and by this means there is scarcely ever any difficulty in discovering rectal fistulæ.

The fistulæ of the small intestine are distinguished from those of the rectum by ascertaining that the rectum is intact, as we may infer when, by means of the sound and rectal injections, we fail to discover any communication between the rectum and vagina. Furthermore, the escape of the digested remains of the food is characteristic, occurring one or two hours after each meal.

Prognosis.

Recent recto-vaginal fistulæ, unless too large, may heal spontaneously by granulation. It is no easier, at least, to cure them by operative treatment than it is the vesico-vaginal fistulæ.

Treatment.

Cauterization with the nitrate of silver, or with the hot iron, is advisable only in the case of quite small fistulæ. If the fistula is at all large, then it must be exposed to view, the edges pared and the stitches applied in the same way as in vesico-vaginal fistulæ. Simon has recently advised, in the more difficult cases, uniting the edges by sutures introduced within the rectum.

The fistulæ of the small intestine are operated upon in precisely the same manner as any other fistulæ, by cauterization or by freshening the edges and applying sutures. It is far more

difficult, however, to remedy a false anus in the posterior vaginal cul-de-sac. In the first place, we must endeavor to convert the anus præternaturalis into a fistula. To this end one blade of a pair of intestine-shears may be pressed into the rectum, and the other into the small intestine, and the attempt made thus to establish a direct communication between the two. A better way, however, is to connect the two extremities of the small intestine with each other by means of the shears, according to the method of C. O. Weber and Heine. If this is successful, the remaining fistula is closed by freshening the edges and applying stitches. Heine has, by this method, achieved a perfect recovery. If the attempt is unsuccessful, we may compel the evacuations to take place through the rectum, by making a large vagino-rectal fistula, and then below this point effecting a transverse obliteration of the vagina.

In a case (not very clearly reported) which was observed by Wilms,¹ several coils of the small intestine became gangrenous and were cast off. Besides a vesico-vaginal fistula, an anus præternaturalis was developed, into which both small intestine and rectum opened. The aperture could not be closed either by cauterization or by sutures.

VAGINISMUS.

Simpson, Edinburgh Med. J., Dec., 1861, p. 594.—*Debout* and *Michon*, Bulletin de thérapeutique, 1861, Nos. 3, 4, 7.—*Charrier*, Contr. spasmod. du sphincter vag. Thèse. Paris, 1862.—*J. Marion Sims*, London Obst. Tr., Vol. III., 1862, p. 356, and Clin. Notes on Uterine Surgery, New York, 1871, p. 318.—*Scanzoni*, Lehrbuch, II., 4. Aufl., p. 263, and Wiener med. Woch., 1867, Nos. 15–18.—*Holst*, Scanzoni's Beitr. z. Geb. u. Gyn., B. V., 1869, H. 2.—*Scharlan*, Berl. Beitr. z. Geb. u. Gyn., B. I., p. 64.—*Hildebrandt*, Archiv f. Gyn., B. III., p. 221.—*Martin*, Berl. klin. Woch., 1871, No. 14.—*Stadfeldt*, Ugeskrift for Laeger, 1872, Nos. 23, 24.—*Breisky*, Schweiz. Correspondenz-Blatt., 1873, 5.

Definition and Etiology.

By vaginismus we understand an excessive sensitiveness of the orifice of the vagina, combined with spasmodic contraction of the constrictor cunni and the muscles of the floor of the pelvis.

With regard to the immediate cause of the affection, we must

¹ Bartels, Arch. f. Gyn., B. 3, p. 502.

entirely concur, so far as the majority of cases is concerned, in the views expressed by Scanzoni. The cause is traumatic, and is due to irrational and frequently repeated attempts at cohabitation; hence it is most commonly observed in newly married women. Impotence of the husband is by no means a necessary condition to its production, and, in fact, is not often present under these circumstances. There may be an unusual narrowness of the vagina, or too great rigidity of the hymen; but they also are not necessarily present. The commonest source of vaginismus is a small vaginal orifice.

If the husband happens to be wholly inexperienced in amatory matters his efforts at connection will very likely be clumsy and ineffectual. The penis will not always hit the right direction, but impinges upon the anterior or posterior commissure. In this respect very much depends upon the position of the vulva, which presents marked variations in different individuals. In fact cases occur where the vulva lies partly upon the symphysis, so that the lower margin of the latter is found below the orificium urethræ. Under such circumstances the penis is directed too far back, and instead of penetrating the orifice of the vagina it is forced into the fossa navicularis. By this means, where the attempts are frequently repeated, a gradually increasing sensibility of the parts is developed, combined with excoriation. Now the wife, beginning to dread cohabitation on account of the pain it causes her, shrinks away from her husband, so that his efforts are defeated; while, on the other hand, the constantly renewed desire leads to frequent repetitions of the attempt, in the hope that, coition once consummated, conception may happily occur, and with it a return to health. Thus the traumatic influence operates more and more frequently, the redness and excoriation in the fossa navicularis or in the region of the urethra are continually increasing, until the sensitiveness of the parts becomes so great that the patient screams out at the least touch. Now reflex spasms become associated with the disorder, and all the pronounced features of vaginismus are present.

Hence vaginismus is most common among wholly inexperienced married couples. I have met with a case where after three years of wedlock, during which the hymen remained

intact, the husband fully supposed that everything was quite as it should be, while the wife only had a vague suspicion that perhaps she was not formed exactly like other women.

In all these cases there is merely increased sensitiveness at first, while the spasms are not developed until later. Thus in the case of a woman who had only been married three months, and who suffered from excessive sensitiveness of the posterior commissure, I found that the introduction of the finger occasioned the most intense pain, together with hysterical convulsions, but gave rise to no contraction of the constrictor cunni.

Beside this class of cases, which decidedly predominates, there is another, in which the spasms form the most prominent feature. They depend unquestionably upon psychical causes (sometimes upon the extreme apprehension caused by the thought of an examination). Thus, in a *virgo intacta* of twenty years, with a protruding hymen (such as we find in new-born infants), I have seen exceedingly severe spasms of all the muscles of the pelvis take place, which commenced as soon as the finger was brought near the parts. There was evidently some tenderness when touched with the sound, but it was not very great. She complained also of spontaneous pains in the vulva and about the anus, and of a desire to micturate.

In another case I met with *vaginismus* in a young woman who had been married for six months. The ordinary etiology did not here apply, for I ascertained positively that husband and wife lived together simply on a footing of pure friendship, as the husband expressed it. Here also the sensitiveness was not at all excessive, but violent spasms of the pelvic muscles occurred on passing the hymen.

Neftel¹ has called attention to still another etiology. He is of the opinion that *vaginismus* may occur also as a symptom of lead poisoning (in one case in connection with paralysis of the extensors, in another, with lead colic, in consequence of using cosmetics which contained lead).

Martin regards *vaginismus* as a *hyperæsthesia* of the vaginal

¹ *L'Union médicale*, 1869, No. 19, and *Brit. and Foreign Med.-Chir. Review*, October, 1873, p. 516.

orifice, induced in consequence of gonorrhœal infection. In none of my own cases was it possible to attribute the affection to gonorrhœa.

Pathological Anatomy.

The anatomical changes found in the orifice of the vagina are usually unimportant, yet in recent cases there is generally redness of the affected parts, erosion, swelling of the follicles, and increased secretion of the mucous membrane; in many cases also we find quite characteristic papillary excrescences, closely aggregated together in the fossa navicularis.

Later, even these appearances may disappear, so that the orifice of the vagina looks perfectly healthy.

The complications which are referred to by many authors are either accidental, as, for instance, the uterine displacements, or secondary to other troubles, such as the inflammations of the womb.

Symptoms.

The properly characteristic symptoms have already been mentioned. They consist in violent paroxysmal pains, which are developed on merely touching the sensitive spots, and in spasmodic contractions of the constrictor cunni, or, in the worse cases, of the entire muscular system of the floor of the pelvis. The spasms are sometimes lacking, notwithstanding the sensitiveness is extreme; in other cases the sensitiveness is insignificant, while the mere touch with the finger or the sound gives rise to spasmodic contractions.

The consequence of this is, that the introduction of the penis is rendered impossible, or at least extremely difficult, so that conception takes place only exceptionally. Packard¹ reports an instance where, although the introduction of the penis had never occurred, nevertheless conception took place, but it terminated in six months in an abortion.

In the further course of the affection, in consequence of the severe and frequently repeated irritation, disorders supervene in

¹ Amer. Jour. of Obst., Vol. II., p. 348.

the other genital organs (though of course such may have existed previous to the vaginismus). General disturbances of nutrition may ensue, and furthermore, hysterical symptoms, emotional disorders, and physical depression are apt to be present. Arndt¹ especially insists that vaginismus plays an important part in the etiology of the psychoses.

Prognosis.

Recovery takes place spontaneously only when the irrational attempts at cohabitation are abandoned, that is, when coition is either not indulged in at all or is performed in a proper manner and considerately. If pregnancy take place, the vaginismus may occur again after delivery.

If the proper treatment is pursued, recovery invariably follows. The very fact that so many different methods of treatment are recommended, all of which insure a recovery, proves that vaginismus is easily cured; moreover, an obvious deduction from this is, that all severe operations are unnecessary.

Treatment.

I have employed the method of treatment advocated by Scanzoni with satisfactory results.

This consists in requiring the husband to abstain entirely from coition, in bathing the external genitals cautiously with lead water, and afterwards, when the redness has subsided, in pencilling the sensitive parts with a solution of the nitrate of silver (one hundred and sixty grains to the fluid ounce). I have also found a solution of carbolic acid (one part to fifty) very efficacious. Vaginal suppositories of cacao-butter, with narcotics, are unnecessary.

If the redness has disappeared, and the vaginal orifice is but slightly sensitive when the finger is introduced, cylindrical specula of gradually increasing size should be passed in daily and allowed to remain for from half an hour to an hour. Though the introduction of the speculum is painful at first, it is well

¹ Berl. klin. Wochenschr., 1870, No. 28.

borne after it has remained there for a little while. If the vaginal orifice has been considerably dilated, and scarcely any tenderness remains, the husband and the wife having been properly instructed, coition may be permitted again, and everything goes well.

I have been so successful with this plan that I have never been obliged to resort to any other method of treatment. Holst¹ recommends ice; Burns and Simpson divided the *nervus pudendus* subcutaneously.

A peculiar plan of operation is proposed by Sims. It consists in excising the hymen, as well as other sensitive spots, and in making afterwards a deep lateral incision in the sphincter, after which a dilator is worn. Whether or not this bloody operation may be necessary in very rebellious cases we are unprepared to say; but, as a rule, it certainly may be dispensed with.

A less severe method than that of Sims is the forcible dilatation, as proposed by different authors—Charrier,² Horwitz, Courty, and Sutugin.³ Under profound anæsthesia both forefingers or both thumbs are introduced into the vaginal orifice, which is then forcibly dilated until the muscle tears.

In America “ethereal cohabitation” has been introduced as a means of cure for vaginismus, that is, the wife is anæsthetized, and while she remains in a state of narcosis the husband performs coitus, with a view of inducing conception, in order that recovery may be brought about by parturition.

In those cases of vaginismus in which the spasms are especially prominent, a very good effect may be derived from hip-baths with a temperature of from 95° to 100° F.

Other Spasms of the Vagina.

Besides true vaginismus, other spasmodic contractions of the vagina occur, which are sometimes accompanied with pain and are sometimes painless. Thus Hildebrandt⁴ calls attention to a

¹ Scanzoni's Beitr., B. V., Heft 2.

² Gaz. des hôp., 1868.

³ Petersburger med. Zeitschr., 1872, Heft 4 and 5, p. 469.

⁴ Arch. f. Gyn., B. III., p. 221.

spasm of the levator ani, in which the penis is firmly grasped during coitus, and for a few minutes is held imprisoned (penis captivus). Ferber¹ reports a case in which a sudden sensation of painful constriction of the vagina occurred during sleep.

Spasmodic contractions of the vagina may be the cause of sterility, by expelling the semen as soon as deposited in the vagina, through the contraction of muscles in the floor of the pelvis. This reflux of the semen has been referred to by Sims² and Storer.³ We would expressly state that it is our firm conviction that the reflux of the semen is a not infrequent cause of sterility, and that it may occur in healthy women without the existence of any painful sensation. Neither the insertion of a ring within the vagina, nor allowing the penis to remain in the vagina for some time after copulation, will be of any avail in preventing it.

DISEASES OF THE VULVA.

Malformations.

It is very necessary to a perfect comprehension of the defects of development in the vulva to premise a few words relative to the normal development of this part.

The vulva is formed in the following manner: At first a depression takes place in the external skin (see Fig. 132, *a*), and this gradually deepens until a communication is established from without with the allantois, which is not yet separated from the bowel (see Fig. 133). At the point where the allantois emerges from the bowel, the perineum protrudes forward, separating the original cloaca into two parts, the sinus urogenitalis in front, and the anus behind (see Fig. 134).

Into the sinus urogenitalis open the most dependent portion of the allantois, which becomes narrowed down to form the urethra, and the inferior extremities of the two canals of Müller, which unite to form the vagina.

¹ Berl. klin. Wochenschr., 1871, No. 15.

² L. c., p. 264.

³ Boston Gyn. Jour., Vol. III., p. 73.

The relation of these parts to each other varies decidedly with the degree of development of the different parts.



FIG. 132.

all, allantois, afterwards the bladder; *r*, rectum; *m*, Müller's canal, afterward the vagina; *a*, external depression of the skin, which becomes the anal orifice.



FIG. 133.

The external depression of the skin is perforated and forms the cloaca (*cl*).



FIG. 134.

The perineum has formed, separating the anus from the sinus urogenitalis (*su*). *u*, urethra; *v*, vagina.

In the beginning, the sinus urogenitalis is comparatively long, and its direct continuation is formed by the lowest portion of the allantois, which becomes the urethra (see Fig. 135). Later it ceases to increase in length, and forms merely the short vestibule of the vagina; and since the urethra, meantime, has remained a narrow canal, while the vagina has become relatively enlarged, the latter then appears to form the direct continuation of the sinus urogenitalis (*i.e.*, of the vaginal vestibule). (See Fig. 136.)



FIG. 135.

The urethra (*u*) still forms the continuation of the sinus urogenitalis (*su*), into which the vagina (*v*) also opens.



FIG. 136.

The genitals complete. The sinus urogenitalis has become the flattened vestibule into which the urethra and vagina (the latter being separated by the hymen) open.



FIG. 137.

Complete atresia. Rectum (*r*), bladder (*b*), and genital canal (*g*) communicate.

The above normal course of development is liable to a whole series of deviations, which result in the following malformations:

Complete atresia occurs when the depression in the external integument, which by perforating into the allantois should form the cloaca, does not take place. Then the bowel and the allantois (which goes to form the bladder) may either communicate, as in the beginning (see Fig. 137), or be separate (see Fig. 138). Not infrequently atresia occurs in connection with other defects of development; for example, it may be associated with a uterus

didelphys, and the bladder and genital canal opening into it then become distended to a shapeless tumor by the urine collecting in them. Under these circumstances the invariable result is a non-viable monster.

In other cases, where the depression of the external integument is not lacking, the cloaca may yet be preserved, by reason of the fact that the perineum, which descends from above and divides the sinus urogenitalis from the intestinal canal, does not develop. We have then what is incorrectly termed *atresia ani vaginalis*; it is, however, more properly an opening of the rectum into the sinus urogenitalis (see Fig. 139).



FIG. 138.

Complete atresia. The allantois has become separated from the rectum (*r*). Bladder (*b*) and genital canal (*g*) distended with urine.



FIG. 139.

Atresia ani vaginalis. The perineum (*d*) has not yet developed so that the cloaca (see Fig. 133) is preserved, and bladder (*b*), vagina (*v*), and rectum (*r*) open into the cloaca in common.

The real character of the preserved cloaca is almost invariably misapprehended, in that its upper portion, by reason of the considerable length which the cloaca often has, is taken for the vagina, and accordingly a communication of the rectum with the vagina is spoken of. Heppner,¹ also, erroneously terms it vaginal cloaca, supposing that the rectum empties into the vagina. In the exceedingly interesting case described by him the two vaginæ are wholly separate, and the part designated by him as the simple vagina belongs still to the sinus urogenitalis, that is, it belongs, embryologically, not to the canals of Müller, but to the allantois. In his "Fig. 3" *b* is not the sinus urogenitalis, as he supposes, but *b*, *e* and *f* form together the cloaca, that is, the sinus urogenitalis, into which not only the urethra and both vaginæ open, but, inasmuch as no perineum has yet developed, the rectum also.

But even where the perineum is developed normally, the sinus urogenitalis, as it exists in the foetus, may be preserved, so that the vaginal vestibule remains uncommonly long and narrow (like a urethra), and the common canal divides into the urethra and vagina, comparatively high up. This defect has been designated—not very happily to be sure—as the *high orifice of the urethra*; it is often associated with hypertrophy of the clitoris, and is then

¹ Petersb. med. Zeitschr., 1870, I., p. 204.

designated as the lowest grade of female hypospadia (see Fig. 140).



FIG. 140.

Persistence of the sinus urogenitalis (s). Into it open the urethra (u) and the vagina (v). The clitoris (c) is hypertrophic. Is easily mistaken for male hypospadia.

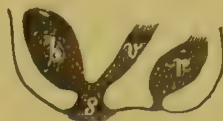


FIG. 141.

Female hypospadia. The entire allantois has been transformed into the bladder (b), so that the latter, without any urethra, opens directly into the sinus urogenitalis (s), the vaginal vestibule.

True hypospadia is understood to embrace those cases in which the sinus urogenitalis has undergone retrograde development in the normal way, while the lowest portion of the allantois, which generally becomes transformed into the urethra, is merged in the developing bladder, and hence the vagina and the bladder open into the vaginal vestibule without any urethra.¹

The manner in which *epispadia* (which, by the way, is much rarer in the female than in the male) occurs, is not fully established, and it is yet a question whether there is always a primary defect in the abdominal wall. This defect might give rise to a rupture of the anterior wall of the allantois, though the rupture of the allantois might also be the occasion of the defect in the abdomen. *Epispadia* may arise in connection with the development of a cloaca.

With regard to the treatment of these defects of development, we observe that for the atresia no operative procedure will afford any relief, except in very rare instances; for, almost invariably, the condition is very complicated, and such that prolonged life is an impossibility.

Moreover, in the cases where a cloaca has been formed, the condition can only be remedied through operations of an extremely complex nature.

In true hypospadia there is involuntary micturition. But even here no plastic operation will avail to provide a urethra capable of performing its function. We must endeavor to close the opening in the bladder by means of a compress which presses the posterior wall against the anterior.

Absence of the vulva is met with in rare instances, even when

¹ Heppner, Monatsschr. f. Geb., B. 26, p. 401.

the internal genitals are normally developed. The sinus urogenitalis then opens in the region of the vulva as a simple aperture. In other cases particular parts of the vulva, as the labia majora and minora, the clitoris, or the perineum, show a rudimentary development.

Moreover, the vulva may preserve its infantile form.

Among the female malformations belongs also female hermaphroditism, that is, that form of defective development in which the malformed female genitals simulate the external genitals of the male. Such cases, that is, misshapen male or female genitals which show a resemblance to those of the opposite sex, were formerly designated by the term *hermaphroditismus transversus*.

Those cases only can be regarded as true instances of hermaphroditism in which well-marked ovaries and testicles are both present in the same individual. It may take the form of *hermaphroditismus lateralis*, in which an ovary is developed on one side, and a testicle on the other, or of *hermaphroditismus androgynus bisexualis*, in which both ovary and testicle occur on each side. Nearly all the cases which have been described as instances of true hermaphroditism rest upon insufficient observation. The case reported by Meyer,¹ however, which was thoroughly investigated by Klebs,² is doubtless to be regarded as an instance of real hermaphroditismus lateralis, though the ovary of the right side was very poorly developed. The only well-established case of hermaphroditismus bilateralis has been recently described by Heppner.³ He examined the genitals of a two months' child whose external genital organs, as is often the case, might have been taken for those either of a male or of a female; of the internal genitals, the female were the best developed, and of the male genitals, the prostate and both testicles (as demonstrated by the microscope) were present. The latter lay close by a parovarium, which at the same time represented a rudimentary epididymis.

Notwithstanding both male and female sexual glandular organs were present in this case, still it cannot be looked upon as a perfect androgyna, that is, as an individual capable of functioning both as a male and as a female, for in all such cases the external genitals are greatly deformed.

Katharina Hohmann,⁴ who has of late years exhibited herself for money in most places in Germany, is a male, though there is probably an ovary on the left side.

¹ Virchow's Arch., XI., p. 420.

² Handb. der path. Anat., IV., Lief. 1, p. 728.

³ Arch. f. Anat., Physiol., etc., 1870, No. 6, p. 679.

⁴ Von Franque, Scanzoni's Beitr., B. V., p. 57. B. Schultze, Virchow's Archiv, B. 43, p. 332. Friedreich, Virchow's Archiv, B. 45, p. 4. Virchow, Berl. klin. Woch. 1872, No. 49.

In the pseudo-hermaphroditism of the woman there is an hypertrophy of the clitoris, so that the latter looks like a penis. Moreover, since the external labia have the form of a scrotum, and are attached to one another below, and since beneath the penis-like clitoris there is usually a very narrow opening into the sinus urogenitalis, the external genitals acquire a striking resemblance to those of a male hypospadias. The urethra and vagina then open into the sinus urogenitalis. The internal female genitals may exhibit all forms of rudimentary development, though they may also be formed normally. The breasts are sometimes feminine, and sometimes but slightly developed, and the entire aspect may be either more feminine or more masculine, as the case may be. In some cases the resemblance of the external genitals to the male organs is increased by the fact that the ovaries are situated in the labia, in consequence of inguinal herniæ, so that it may seem on examination as though one were feeling testicles in a scrotum.

Atresia of the labia minora is a deformity that may be acquired. Sometimes in little girls adhesions of the labia minora are met with, extending from below as far as the region of the urethra, and in rare cases beyond, so as to interfere with the evacuation of the urine.

The adhesion may generally be remedied by tearing the labia apart; in the worst cases a division is effected with a bistoury and grooved probe.¹

The large labia may also be adherent posteriorly, so that the perineum has the appearance of extending very far forward.

HYPERTROPHY OF THE VULVA.

Hypertrophy of the nymphæ occurs amongst certain tribes (Hottentots, Bushmen) as a peculiarity of the race, and is commonly known as the Hottentot apron (this, however, should be distinguished from the peculiar deposit of fat in the nates, which also occurs in the Hottentot women).

But hypertrophy of one or both labia is not an uncommon thing with us too; and it occurs of the same magnitude as seen

¹ *Bökei*, Jahrb. f. Kinderheilk., 1872, V. 2, p. 163.

in Luschka's¹ illustrations of Hottentots. Occasionally, though not always, the enlargement is due to onanism; the nymphæ hang down and show a brownish pigmentation, but, as a rule, no further changes appear.

Moreover, they generally occasion no special symptoms, though, exceptionally, they may act as a bar to pleasurable sensations during coition. In a case reported by Breslau² there was incontinence of urine, which disappeared after the operation.

Amputation of the nymphæ is a simple and perfectly safe operation.

Hypertrophy of the clitoris may occur as a congenital malformation, of which we have spoken above, and it may also be acquired and become so great that the clitoris may be larger than the male penis. In Germany such an hypertrophy appears to be extremely rare—at least it is observed in women who masturbate only very exceptionally, for in women who have long been addicted to the habit the clitoris usually remains quite normal.

But where the clitoris is greatly enlarged, and other morbid symptoms exist which must necessarily be ascribed to it, clitoridectomy becomes indicated. The removal by the knife is doubtless preferable either to the operation with the ligature or to that with the écraseur (with which Mason³ removed a clitoris four inches long). If the hemorrhage is profuse, and the deep application of sutures does not suffice to still it, a tampon saturated with a solution of perchloride of iron may be employed.

But while clitoridectomy, when performed under these conditions, is a perfectly justifiable operation, the indiscriminate extirpation of the normal clitoris, as practised by Baker Brown, and for which he was expelled from the London Obstetrical Society, is to be decidedly condemned.

Neither in hysteria, nor in epilepsy, nor in onanism, nor in the psychoses that are connected with sexual processes, can anything be accomplished by the removal of the normal clitoris.

¹ Monatsschr. f. Geb., B. 32, p. 343.

² Scanzoni's Beitr. zur Geburtsh., B. 3.

³ New York Med. Record, Vol. III., p. 104.

ACUTE CATARRH OF THE VULVA.

Huguier, Acad. de Méd., Sept. 8, 1846, and *Journal des Connais. méd.-chir.*, 1852, Nos. 6-8.—*Oldham*, Lond. Med. Gaz., May, 1846.—*Von Bärensprung*, *Charité-annalen*, VI., 1, p. 20.—*Martin et Leger*, *Arch. gén.* Janvier et Février, 1862.—*Zeissl*, *Allg. Wiener med. Z.*, 1865, Nos. 45, 46.—*Kühn*, *Zeitschr. f. Med., Chir. und Geb.*, 1866, V., p. 114.

* *Etiology.*

An acute inflammation of the vulva may be produced by want of cleanliness, by discharges from the internal genital organs or from urinary or fæcal fistulæ, by injuries, violence (rape), masturbation, or violent cohabitation, but most commonly by infection with gonorrhœal poison. Erythema of the labia majora may be produced by friction against the inner surfaces of the thighs, particularly in fat persons, during the hot season of the year, and after protracted walking.

In children inflammation of the external genitals may arise from the oxyuris creeping into the vulva from the anus.

Pathological Anatomy.

The acute catarrh is marked by swelling, relaxation, and injection of the mucous membrane. The nymphæ are especially swollen, and discharge a profuse muco-purulent secretion. The small sebaceous glands are also swollen by the retained secretion, and may thus form acne tubercles, or even pustules. In the latter case the adjacent connective tissue may also become inflamed with the development of a furuncular abscess which discharges offensive pus.

In the virulent form of catarrh, acuminate condylomata are very apt to develop on the labia minora, the carunculæ myrtiformes, and in the vicinity of the orifice of the urethra. Furthermore, in gonorrhœa, though also exceptionally in benign catarrhs, inflammation of the glands of Bartholini is liable to occur either on one side or on both. Sometimes suppuration is confined to the excretory duct.

Symptoms.

In severe cases the inflammation of the mucous membrane occasions very intense pain, which is particularly severe when the two sides chafe against each other in walking. There is also a discharge, which is sometimes mucous, in other cases wholly purulent. In case a gland of Bartholini suppurates, a tumor is developed in one labium, but rarely becomes larger than a pigeon's egg. The pus is discharged either through the normal excretory duct, or through a perforation on the inner surface of the small labium. The consequence of the abscess may be complete obliteration of the gland.

Diagnosis.

The affection is easily recognized, inasmuch as the affected parts may be exposed directly to view. The swelling of the gland of Bartholini is discovered by its situation and by the tenderness of the roundish tumor.

Treatment.

By observing absolute rest and the proper degree of cleanliness the catarrh soon disappears. It is particularly important to thoroughly remove the secretion from the diseased mucous membrane in the gonorrhœal form, which sometimes lasts for a considerable time; but it is difficult to do this, on account of the crypts in the mucous membrane in which the secretion adheres. If the secretion continues abundant for a long time, astringents are required.

The abscess of Bartholini's gland may sometimes at an early stage be evacuated through the duct by pressure; when this is impossible it must be incised.

Chronic catarrh may be the sequel of the acute, but it is very commonly observed in all those cases where various discharges from the internal genitals are present.

If the cause which produced it is withdrawn, it recedes of itself; but, again, it may be extremely obstinate, causing a long-continued irritation and hypertrophy of the vulva.

Phlegmonous processes in the vulva, sometimes leading to considerable swelling of the labia, are liable to occur, secondarily, in consequence of infected wounds of the vaginal orifice; hence, more particularly in connection with puerperal ulcers.

Gangrene of the vulva, besides occurring in childbed, may happen in small-pox, measles, scarlet fever, typhus, cholera, etc., and also in consequence of diphtheria. In children, it occurs spontaneously in the form of noma.

Erysipelas and herpes in this region differ in no respect from these affections when they occur in other situations.

HERNIÆ OF THE VULVA.

An inguinal hernia descending into the labium majus of the corresponding side is known as *hernia labii majoris anterior*.

By the term *hernia labii majoris posterior* is designated a hernia which causes the lateral peritoneal pouch, in front of the ligamentum latum, to protrude downwards, and to emerge in the labium.

Hernia perinealis is formed by a protrusion of the peritoneum behind the ligamentum latum, and emerges at the perineum.

The diagnosis of these herniæ is not unimportant, since by mistaking them for other tumors serious consequences may arise. They may be recognized from the fact that it is possible to trace them upwards into the abdominal ring, as can most easily be done in the inguinal herniæ; furthermore, from the fact that an impulse and a forcible protrusion downwards is produced in coughing, from the possibility of reducing them, and from the tympanitic intestinal resonance.

NEOPLASMS OF THE VULVA.

Aubenas, Des tumeurs de la vulve. Thèse. Strasbourg, 1860.

Elephantiasis.

Herzog, Ueber die hypertrophie der äusseren weiblichen Genitalien. Erlangen, 1842.—*Rogers*, London Obst. Tr., Vol. XI., p. 84.—*Jayakar*, Med. Times, 1871, Vol. I., p. 37.—*L. Mayer*, Berl. Beitr. z. Geb. u. Gyn., I., p. 363.

Etiology.

The erysipelatous attacks which precede the elephantiasis cruris are, as a rule, wanting in hypertrophy of the vulva, which comes on insidiously.

In the East, elephantiasis of the vulva is very much more common than here. Where a predisposition to it exists, it occurs at the height of sexual development—most generally between the ages of twenty and thirty—and is usually owing to inflammatory irritation acting upon the vulva. Of importance in this connection are, first, syphilitic infection, then masturbation and sexual excesses generally. Moreover, the development of an elephantiasis may occasionally be provoked by a blow or a contusion.

The diseased labia are often greatly swollen just before or just after menstruation, and sometimes they increase in size very rapidly during pregnancy; Louis Mayer, however, observed improvement take place under the latter condition.

Pathological Anatomy.

It is rare that the vulva is hypertrophied uniformly; generally only certain portions are the seat of the tumefaction, and most commonly the labia majora, next the clitoris, and most rarely of all the nymphæ.

The affection consists in a hypertrophy of the structure forming the external integument. According to Virchow¹ there is, in the first place, probably a disease of the lymphatic glands, which interferes with the backward flow of the lymph. In consequence of this the skin becomes saturated with lymph, and the connective tissue becomes hypertrophied. The epidermis, in elephantiasis of the vulva, is generally about normal, though occasionally thickened. The papillary body is sometimes greatly hypertrophied, so that the tumor consists almost wholly of papillary growths. These are so like enormously developed condylomata acuminata that it is impossible to discriminate between the two conditions.

¹ Geschwülste, I., p. 320.

In the interior of the tumor the hyperplasia of the connective tissue advances irregularly, so that uneven nodulated tumors are produced, which give the surface an irregular appearance, and the tumors are sometimes pedunculated.

Louis Mayer¹ describes a case which was of an ulcerative form, the ulceration being the most marked feature.

Symptoms.

The tumor may be extremely annoying, since it sometimes becomes so large as to reach below the knee, weighing as much as thirty pounds. It then becomes a serious mechanical impediment and a very burdensome weight. It may be very painful too, and discharge a copious secretion.



FIG. 142.

Elephantiasis of the vulva, after L. Mayer. The hypertrophied left labium (a) is seen behind the enlarged clitoris.

Conception may take place notwithstanding, even in the most aggravated cases (as shown by a case of Jayakar's). Even very large tumors do not impede delivery, for the vagina remains intact.

Treatment.

Since the elephantiasis does not get well of itself, and antiphlogistic treatment is only of service at the commencement of the disease, it is necessary to remove the tumor by an operation. This may be done with the knife, with the scissors, or else with the galvano-caustic wire loop. Notwithstanding the great size of the tumor the oper-

¹ L. o., Taf. XIII., Fig. 4.

ation for removing it is tolerably simple, since, particularly where the tumor consists of the hypertrophied labia, the diseased portions may be simply cut away.

Relapses are very rare.

Lupus of the Vulva.

Martin and Lorent, Mon. f. Geb., B. 18, pp. 348 and 350.

Lupus very rarely affects the vulva, but it sometimes develops in this situation, and may occur in any of its forms and in any part of the vulva, even to the perineum.

The diagnosis must depend upon the microscopic appearances and the various other characteristic marks of the disease.

The prognosis is far more favorable than that of carcinoma, for a spontaneous cure may result after considerable cicatrization.

A cure may also be effected by destroying the new growth by means of the strongest caustics.

Papillary Growths. Condylomata.

Thibierge, Archives générales, Mai, 1856.—*Klob*, Path. anat. d. weibl. Sex., p. 459.

We pass by here the syphilitic hyperplasia of the papillary body, with superficial ulceration (the flat condylomata).

Extensive papillary growths, known as condylomata acuminata, develop in consequence of the irritation of the gonorrhœal poison, but according to Thibierge they may also occur in pregnancy independently of gonorrhœa. The acuminate condylomata may become very large, and form such enormous tumors (*Gascoyen*¹ saw one as large as a child's head) as to resemble the papillary form of elephantiasis.

Most of these condylomata are undoubtedly gonorrhœal in their origin; after delivery they disappear.

The so-called *caruncles*—small, flat, or pedunculated polypus-like growths—develop most usually around the orifice of the urethra, in the form of circumscribed hyperplasiæ of the mucous membrane, with implication of the follicles.

The sebaceous follicles may become plugged up, producing

¹ Med. Times, Jan. 21, 1872.

acne of the labia, but these must not be confounded with the little elevations of the skin like goose flesh, which, according to Klob, consist of growths analogous to tubercular formations, and, in the form of *prurigo senilis*, occasion violent itching.

Cysts of the Vulva.

Boys de Loury, Revue méd. de Paris, Dec., 1840, T. IV.—*Huguier*, Mém. de l'acad. de méd., T. XV., and Gaz. méd. de Paris, 1826, 14, 37.—*Von Bärensprung*, Charitéannalen, VI., I., p. 41.—*Lotze*, Ueber Cystendegeneration der Cowper'schen Drüsen der Frau. Diss. inaug. Göttingen, 1869.

The cysts of the glands of Bartholini are the most common of the cysts of the vulva. They may spring either from the excretory duct or from the gland itself. In the former case they are oblong at first, and become afterwards round, while those of the gland itself grow to a larger size and exhibit occasionally a lobulated form. They are situated in the labium majus, in the region of the gland or of its excretory duct, though exceptionally, and as shown in a case observed by Hoening,¹ they may extend up along the side of the vagina into the true pelvis, and even beyond the vaginal cul-de-sac.

The contents of the cysts are usually clear, mucilaginous, and stringy, but occasionally they are colored, even to a dark brown sometimes.

They cause no disturbance other than mechanical, and hence only produce discomfort; still, at the menstrual periods, they may swell up and become painful.

The elastic consistence and painlessness of the cyst suffice for its diagnosis, and the characteristic seat indicates the variety.

It is not sufficient simply to evacuate the cyst, for it fills up again, but it must either be injected with iodine or else extirpated.

Other cysts, however, occur upon both the labia majora and the labia minora; they remain for the most part small, though exceptionally they may grow to be as large as a child's head. Their etiology is obscure. It is possible that they develop in consequence of contusions of the connective tissue, and prob-

¹ Monatsschr. f. Geb., B. 34, p. 130.

ably also in connection with hemorrhages. The cyst wall is firm and distinct, and the contents may be either serous or mucous in character, and have a variable color.

Dermoid cysts also occur in the vulva.

Lipomata.

Lipomata occur in the labia majora and on the mons veneris, and may attain an enormous size. Thus Stiegele¹ removed one weighing ten pounds, and Koch² extirpated one entire which hung down to the knees and the lower half of which had already been cut off by the patient herself with her husband's razor.

Fibromata.

Storer, Bost. Gyn. Jour., Vol. IV., pp. 271, 325, and 336.—*Morton*, Glasgow Med. Jour., 1871, p. 146.—*Grime*, ibidem, p. 265.

These growths usually consist of true fibro-myomata, which spring from the labia majora, and can be enucleated from their surroundings. When they attain a considerable size they drag down the skin by their weight, like polypi, and hang between the thighs; indeed the traction may be so great as to develop ulceration in the skin. Fibromata, like the uterine fibroids, may become œdematous (particularly during the menstrual periods and pregnancy), and may even develop cysts.

The extirpation is not at all difficult, for when the tumor has drawn down the skin into a long pedicle it may be simply cut off, and in the other case they are enucleated from the labia.



FIG. 143.
Fibroid of the labium majus, after Storer.

¹ *Zeitschr. für Chir. u. Geb.*, 1856, B. IX., p. 243.

² *Gräfe und Walther's Journ.*, 1856, p. 24, p. 308.

Carcinoma of the Vulva.

Louis Mayer, Virchow's Archiv, B. 35, p. 538, and Mon. f. Geb., B. 32, p. 244.—
Behrend, Diss. inaug. Jena, 1869.

The cancerous degeneration may proceed from the labia majora or minora, or from the clitoris, and occurs in the most various forms, sometimes having more the nature of a canceroid neoplasm and sometimes occurring in the form of cancerous ulceration. The pain is not very severe usually, and at first only a certain inconvenience is experienced, owing to the presence of a tumor in the vulva; after ulceration has taken place, however, the tumor becomes extremely annoying.

The diagnosis is simple, and with regard to treatment, where there is any prospect of success, the growth should be removed by an operation.

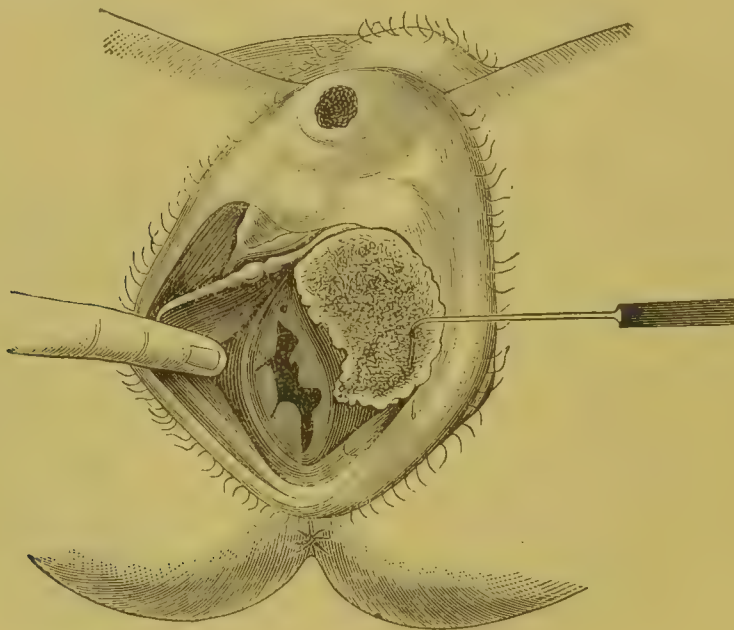


FIG. 144.

Carcinoma of the vulva. The tumor of the left labium ulcerated, likewise that of the mons veneris.

In the case represented in Fig. 144, the left labium minus was undoubtedly affected originally; a large secondary tumor developed on the mons veneris at the point where the labia meet, and a little to one side. Moreover, the inguinal glands were markedly infiltrated. Owing to the fact that besides the extensive local affection, a small retro-uterine tumor of a suspicious character was discovered, no operation was undertaken.

The chances for an operation were better in the case represented in Fig. 145, in which the external genitals showed a complete senile atrophy. The clitoris was indicated merely by a diminutive tubercle without præputium or frenulum; the left labium minus was quite obliterated, the labia majora somewhat atrophic. The inner



FIG. 145.
Carcinoma of the vulva.

surface of the right labium majus was occupied by a carcinomatous tumor, almost as large as a hen's egg, which, commencing at the right side of the clitoris, extended as far as the frenulum, and probably sprang originally from the right labium minus. It had been twice operated upon by the physician in charge of the case, so that the existing tumor was the second relapse in the same place. The tumor was excised with the production of considerable hemorrhage, and the incisions were so made that the edges of the wound were situated in perfectly sound tissue. The wound healed, so far as it had been stitched, per primam intentionem; in the region of the clitoris, where the chloride of iron had been applied, it healed with copious suppuration. Under the microscope the tumor appeared evidently cancerous; flat and cylindrical epithelial cells lay in alveoli of connective tissue. Fourteen months after the operation there was not the least sign of a relapse.

Sarcoma of the Vulva.

Louis Mayer, Monatsschr. f. Geb., B. 32, p. 250.

In Mayer's two cases there were warty sarcomatous growths in the vulva.

Neuromata.

Simpson found neuromata beneath the mucous membrane in the vicinity of the meatus.

THROMBUS OR HÆMATOMA OF THE VULVA.

The bloody tumors of the vulva, excepting those associated with parturition, are almost exclusively traumatic. Von Franque¹ saw a thrombus develop in the labium majus of a woman who had never borne children, in consequence of violent straining at stool.

RUPTURE OF THE PERINEUM.

Verhaeghe, Mém. sur un nouveau procédé, etc. Bruxelles, 1857.—*Biefel*, Mon. f. Geb. B. 15, p. 401.—*J. Baker Brown*, Surg. Diseases of Women, 3d ed. London, 1866, p. 1.—*Lane*, Lancet, 1866, I., No. 5.—*Simon*, Prager Viertelj., 1867, B. 3, p. 80.—*Hirschberg*, Die Operation des veralteten complicirten Dammrisses.—*Heppner*, Langenbeck's Archiv, B. X., p. 655, and B. XV., p. 424.—*Freund*, Tageblatt d. Wiesbadener Naturforscherversammlung, 1873, p. 175.

Leaving the etiology of rupture of the perineum, as well as its prophylactic treatment, and also the treatment of the recent rupture, to the treatises on obstetrics, we shall confine ourselves here to the consideration of old ruptures of the perineum which have cicatrized.

The symptoms produced by old ruptures of the perineum may be of an injurious character, and, under certain circumstances, are most distressing and unfortunate.

We have already referred to the facility with which prolapse of the posterior wall of the vagina and of the uterus occurs when the floor of the pelvis is lacking.

But apart from this, where, in aggravated cases, the sphincter has been torn through, inability to retain the intestinal evacuations may exist, not to such an extent that the entire fecal contents of the bowel escape, but to such a degree that perhaps only flatus escapes involuntarily, or, while the patient has the power of retaining hardened fæces, so soon as diarrhœa occurs, defecation becomes involuntary.

The treatment of old perineal ruptures must, of course, be operative, and this involves (since the vulva and anus lie in close proximity to each other) the formation, artificially, of a new perineum.

¹ *Memorabilien*, 1867, I., p. 6.

The operation of *perineoplasty*, as described by von Langenbeck, is performed in the following manner :

That portion of the surface which is covered with skin, and which extends from the vagina as far as or into the sphincter, is dissected up in such a way that a vaginal flap is formed. The edges of the wound are then stitched together laterally, so as to form a new perineum, which towards the vagina is covered with the vaginal flap. If the rupture is deeper, the mucous membrane is also separated from the rectum, and the anterior surface of the rectum is covered over and united by sutures with the newly formed perineum.

This complicated and difficult operation is not apt to be very successful, since by taking flaps from the mucous membrane there is a great liability of a recto-vaginal fistula being left behind.

Far better results are obtained with the *perineoplasty* proposed by Simon. In this method, unless the rupture extends into the sphincter, the region of the perineal cicatrix is freshened in the shape of a triangle, the apex of which extends into the vagina, while the anal orifice lies at the middle of its base. Then the two limbs of the triangle which extend into the vagina are united, and afterwards the two halves of the base are joined by perineal sutures to form the new perineum.

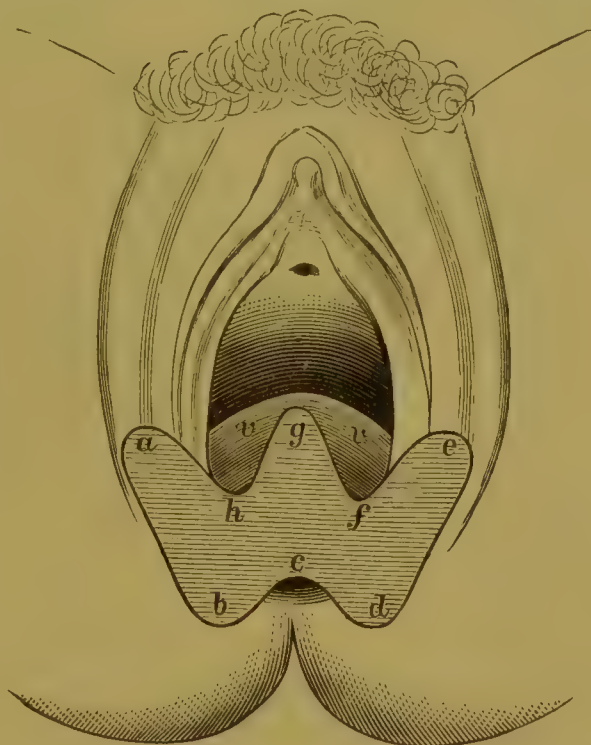


FIG. 146.

Perineoraphy according to Simon.

v, posterior vaginal wall; a, b, c, d, e, f, g, h, the freshened part, the sides a b and d e uniting to form the perineum, b c and c d, the anterior rectal wall, and a, h, g, and e, f, g, the posterior vaginal wall.

If the rupture extends quite through the sphincter, the middle angle of the freshened part is directed inwards into the

vagina; and, in addition to this, the freshening is extended on either side in the form of butterfly wings, as illustrated in Fig. 146. Then, vaginal stitches are taken in the portion freshened in the vagina, and the stitches are tied so as to present an appearance as represented in Fig. 147. Next, sutures are introduced in the vagina and rectum (deep sutures in the latter case) alternately, and are immediately tied, so that the knots lie both in the vagina and in the rectum, and the vagino-rectal wall is artificially elongated. Finally, the perineal stitches are put in, rather superficially, because they have not much to hold, the tension being borne chiefly by the rectal stitches.

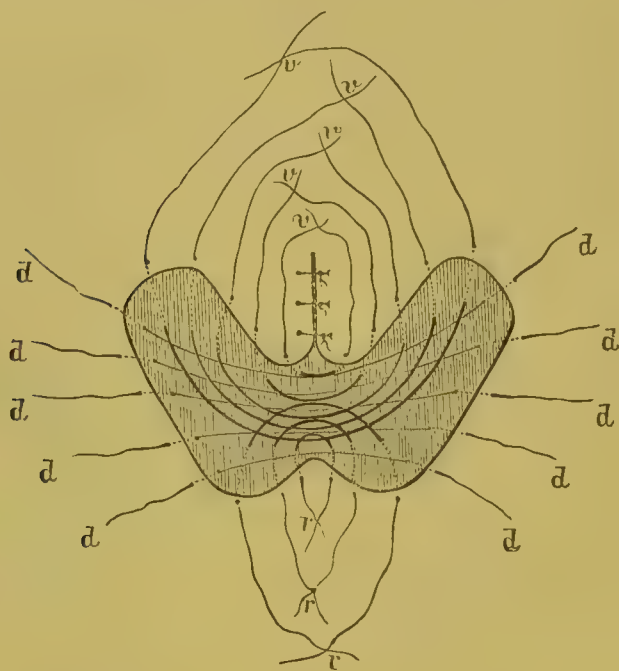


FIG. 147.

Arrangement of the stitches in Simon's perineoraphy. The stitches which close the angle projecting into the vagina are already tied; *vv*, vaginal stitches; *rr*, rectal stitches; *dd*, perineal stitches.

The after-treatment is mainly passive. Care should be taken to prevent diarrhœa, and eventually the sphincter ani may have to be divided posteriorly. The perineal sutures are removed after three days, since they otherwise will cut through; the vaginal and rectal stitches are taken out gradually from the fifth to the sixth day, the latter not all being removed before

the twelfth. The rectal stitches must be sought for with the speculum.

PRURITUS VULVÆ.

C. Mayer, Verh. d. Berl. Geb. Ges., VI., p. 137.

Etiology.

Pruritus, or an itching sensation in the vulva and its vicinity, is frequently owing to long-continued external irritations, such as arise from acrid discharges, in blennorrhœa particularly, though also in carcinoma of the uterus. Here also probably belong those cases in which pruritus occurs during the menstrual flow, as well as those that occur in connection with diabetes, where the vulva is bathed in the saccharine urine (according to Friedreich,¹ the pruritus is then owing to the development of fungous organisms).

Pruritus occurs also in connection with inflammation of the uterus and vagina, without any irritating discharge; moreover, it also occurs in diseases of the urethra, bladder, and kidneys.

In other cases, onanism may be the cause, as well as the effect of pruritus, an intolerable itching occurring secondarily, in consequence of the continued irritation; though onanism by no means invariably leads to pruritus.

But cases also occur in which the above causes are entirely lacking. They are generally met with in women somewhat advanced in life, who are either approaching or have reached the climacteric.

Pathological Anatomy.

Changes in the vulva, properly characteristic of pruritus, are either wanting entirely or at least are very slight; very exceptionally a true papular dermatitis with the above-mentioned little prurigo tubercles is met with.

The secondary effects of pruritus are more apparent. We frequently find excoriations, with scabs upon them, due to the scratching, together with swelling and infiltration of the vulva,

¹ Virchow's Archiv, B. 30, p. 476.

which is often very apparent to the eye, and is owing to the prolonged irritation. Moreover the brown, or slate-gray pigmented skin presents a peculiar rigid appearance, and, on account of the abundant desquamation, yields a thick, whitish secretion.

Symptoms.

Pruritus, especially in its lighter forms, is pretty common ; it consists in a violent itching of the orifice of the vagina, as well as of the lower portion of the vagina, of the labia majora, of the perineum, of the mons veneris, and of the adjacent surfaces of the thighs. The itching, which is occasionally accompanied with sexual excitement and erection of the clitoris, occurs most commonly in bed at night ; it is also especially marked during any considerable excitation of the genitals, after physical exertions (in a warm temperature), as well as after excitements of the circulatory system.

The itching also occurs in paroxysms often, so that ordinarily the patient feels perfectly well, or is merely conscious of slight abnormal sensations in the genitals, while from time to time, every few days, every day, or several times in a day, an attack of intense itching comes on, which, beginning at some particular spot in the vaginal orifice or in the anus, thence radiates to the adjacent surfaces of the thighs and extends into the vagina.

The pruritus is sometimes extremely intense, so that intelligent women declare that it will drive them to suicide, and women who possess great self-control are unable to resist scratching the affected parts. By this means the above-mentioned consequences are produced, including in many cases, onanism. Furthermore, disorders of nutrition ensue, together with an inclination to solitude, insomnia, and profound melancholic depression.

Treatment.

First of all, attention must be directed to the removal of any evil to which the affection may be owing, more particularly discharges of various descriptions. In this connection great benefit

may be derived from the regular employment of hip-baths, the temperature of which will depend upon the condition and age of the individual, and they should be repeated at least twice daily. The addition of potash to the bath will prove very serviceable.

Of actually curative agents we can only speak with confidence of the carbolic acid. I use it in a solution of one part to sixty, but most frequently from one to fifty to one to twenty, and indeed in the worst cases as strong as one to ten. Although it is only recently that I have commenced to employ this remedy, having thus far used it in only six cases, and being therefore unable to assert that relapses may not follow, yet the healing effect has been so obvious that I am sure no one who has once tried the carbolic acid will ever return to any of the other remedies that have been recommended.

Among the latter, it has been proposed to smear the affected parts with a chloroform liniment (one part of chloroform to ten of almond oil according to Scanzoni), and Scanzoni and Veit have advised applying alum within the vagina either in solution or mixed with sugar, on cotton tampons; in the worst cases, pure powdered alum, according to Scanzoni, may be introduced into the vagina.

Weston and Martin¹ recommend tar, either in an alcoholic solution (four parts to thirty) or mixed with glycerine.

In very obstinate cases cauterization with potassa fusa has been employed, but with no very good effect. Dawson² saw a relapse occur in a case of follicular vulvitis, notwithstanding the fact that the entire mucous membrane had been cut away by Thomas.

COCCYGODYNIA.

Simpson, Diseases of Women. Edinburgh, 1872, p. 202.—*Scanzoni*, Würzb. med. Z., II., p. 4, and Krankh. d. weibl. Sexualorg., II., p. 325—*Hörschelmann*, Petersb. med. Z., 1862, H. 16.—*Nott*, Amer. Jour. of Obstet., Vol. I., 243.

Occurrence and Etiology.

There sometimes occurs, not exclusively, though by far most

¹ Boston Gyn. Jour., Vol. IV., p. 79.

² Amer. Jour. of Obstet., Vol. II., p. 113.

commonly, in women, and especially in such as have borne children, a violent pain in the region of the coccyx.

Its origin is generally traumatic, and it is most commonly associated with parturition, especially in deliveries with the forceps. The pain may, however, be produced by other traumatic influences; thus Scanzoni attributed it, in two instances, to riding.

According to Simpson, coccygodynia may also arise from exposure to cold (the case occurred in a washerwoman).

Pathological Anatomy.

Since the pain is localized in the coccyx, and is developed on motion of this part, its seat is doubtless either in the periosteum or in the articulations of the coccyx. Scanzoni found the coccyx very long in several cases, as well as unusually movable, and frequently it was deflected to one side; he has also found decided inflammation, and even suppuration, in the vicinity of the bone.

Symptoms.

The sole symptom is the pain, which is called forth especially when the muscles inserted in the coccyx—the gluteus maximus, coccygeus, and levator ani—are contracted.

The pain is most sure to be excited in sitting down and getting up; in many cases it continues while the patient sits, and, in fact, some women can only sit on one buttock, while they support themselves perhaps with one hand. Moreover, the pain is sometimes produced by walking. Defecation is apt to be especially painful.

Occasionally the pain occurs only in connection with certain particular (not always the same in different individuals) actions of the muscles. Thus in a case that came under Scanzoni's observation, the pain always became very severe during coition.

The degree of the pain is very variable; sometimes the patient is conscious merely of a dull, heavy sensation in the region of the coccyx, while in other cases the pain is of the same character and intensity as a toothache.

The coccyx is tender on pressure; occasionally, however, only over the posterior surface, while from the rectum it may be touched without causing any discomfort; passive motion of the coccyx is always extremely painful.

Coccygodynia is a tedious disease, and is often very rebellious to treatment, and shows a decided tendency to relapses.

Treatment.

Scanzoni recommends in those cases which manifest hyperæmic or inflammatory symptoms, local antiphlogistics, in addition to the maintenance of continued rest in the horizontal posture, and attention to keeping the bowels freely open. He has also seen subcutaneous injections of morphine followed even by permanent relief.

Simpson, on the other hand, who denies the efficacy of these means, cures the affection by an operative procedure. He either divides the tendons, which are attached to the coccyx, subcutaneously, or, in the most obstinate cases, extirpates the entire coccyx, as had been previously recommended and several times performed by Nott.

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